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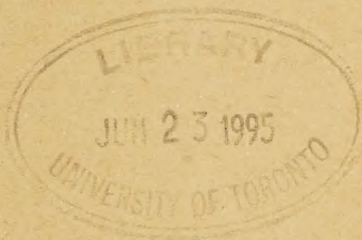
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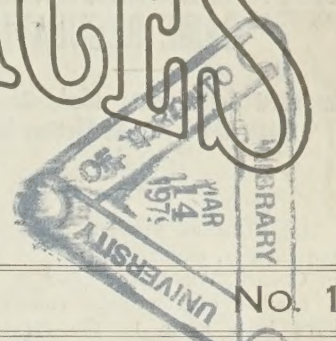
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NATURAL RESOURCES CANADA

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JANUARY, 1930



No. 1

MILLION-BARREL OIL PRODUCTION FOR ALBERTA

REMARKABLE INCREASE
RECORDED IN PAST YEAR

Optimistic Review of Oil and Gas Development in Western Canada by
Minister of the Interior

The following statement on oil and gas developments in Western Canada during 1929 was issued by Hon. Charles Stewart, Minister of the Interior:—

"The steady progress which characterized the previous four years in the prospecting, development, and production of the petroleum and natural gas resources of Western Canada showed a rapid increase during 1929. The interest already stimulated by the notable results recorded in 1928 only needed the additional fillip from the completion of highly productive wells by the Home Oil Company, situated over three miles southeast of Royalite No. 4 in the Turner valley, Alberta, to draw the attention of the whole oil world to the potentialities of that area. This started an unprecedented drilling activity on the Turner Valley and other structures, already productive of results, the bulk of which remain for the near future.

"Not only did structures immediately adjacent to that of Turner valley become the centres of drilling activity but energetic prospecting and drilling has extended over a considerable portion of Alberta, with the result that at Ribstone, Oyen, Skiff, and Coutts good strikes of heavy crude oil have been recorded, in each case sufficient to justify prolonged testing, which taken in conjunction with the moderate depths at which the oil was encountered, make the prospects of a satisfactory production of this grade of oil very encouraging. Actual oil production is still confined to the province of Alberta and for all grades of oil amounted to 902,226 barrels for the eleven months ending November 30. It is estimated that the amount for the twelve months will slightly exceed 1,000,000 barrels. The figures for preceding years show how rapid has been the increase, although it will be noted that naphtha is the principal contributor to this growth, heavy crude also showing a gratifying addition, whilst light crude remains stationary. The failure of the increase in production of light crude to respond to that of naphtha is attributable to the practice of Turner Valley operators in drilling directly to

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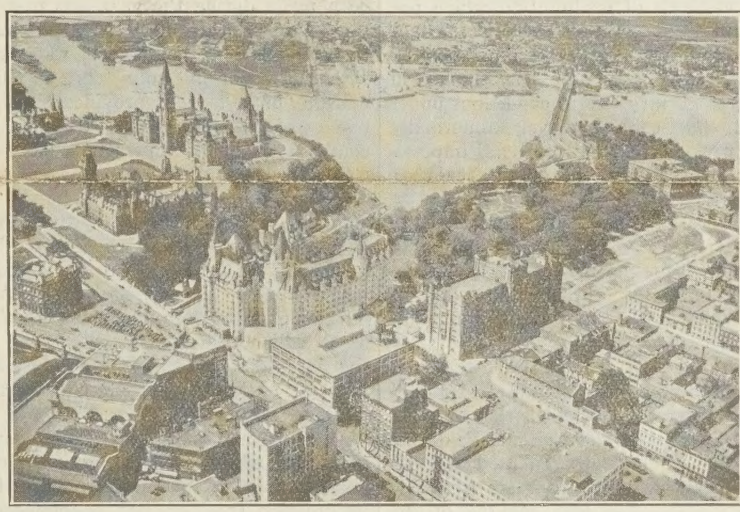
PROGRESS IN DEVELOPMENT OF CANADA'S NATURAL RESOURCES

Honourable Charles Stewart Issues Statement on Year's
Accomplishments in Departments in His Charge

The Departments of the Interior, of Mines, and of Indian Affairs, for the direction of which I am responsible, are almost wholly concerned with matters of lands administration, forestry, mining, water-power, northern development and care of native races. Progress in

continues upward and in the first ten months of 1929 there were 14,622 homestead entries as compared with 11,484 for the same period of 1928.

Mining.—The Department of the Interior, which is responsible for the administration and development of all



Canada's Capital from the Air—View of a picturesque portion of Ottawa looking northwest towards the city of Hull. The Parliament Buildings in their beautiful setting appear at the left. About the centre is to be seen the enlarged Chateau Laurier, with Major Hill park to the right and beyond that the Interprovincial bridge spanning the Ottawa river.

these is fundamental to our national prosperity and a survey of the activities of the three departments shows that there has been a further substantial advance on almost every front over that previously recorded. This advance continued up to the close of the year in spite of the recession in stock market values of the last three months which followed the serious crashes experienced on exchanges all over the world, and is the best guarantee that the people of the country could have of the healthy underlying condition of business.

Lands Administration.—First in the list of natural resources stands the vast total area of fertile land. In taking up land for farming purposes men not only show their faith in the country but by this act and what follows they increase the nation's production and prosperity. The number of homestead entries in the Prairie Provinces is an index to the collective judgment of practical men throughout the Dominion in respect to land values. It is, therefore, a matter of first importance that, even though the number of homestead entries in 1928 was more than double that in 1927, the movement still

mineral resources of Dominion lands, and the Department of Mines, which is in charge of scientific and investigative work calculated to assist the mining and metallurgical industries throughout the Dominion, are working hand-in-hand to promote the wider development of our mineral wealth and to increase the output, from our smelters and refineries, of metals produced from ores mined in Canada.

The extensive metalliferous deposits of Manitoba and Saskatchewan which have attracted international attention for the last two or more years have encouraged prospecting operations on a wide scale in the country still farther north—even well within the Arctic Circle—the difficulties of transportation attendant upon such undertakings having been overcome by the extended use of aeroplanes and tractors. But progress has not been limited to any one section of the country. In all parts of Canada increased activity has been manifested in mineral development, and conservative official estimates of the total production for 1929 are placed at about \$300,000,000 or about 15 per

(Continued on page 3)

HYDRO-ELECTRIC DEVELOPMENT IN CANADA IN 1929

SUBSTANTIAL ADDITION TO
TOTAL INSTALLATION

Honourable Charles Stewart, Minister of
the Interior, Reviews Year's Operations
—Many New Developments

The quickening of production, witnessed in recent years, in practically all lines of industry is considered by economists to be largely due to an increased supply of power and a widening of its uses. Special significance, therefore, attaches to the annual review of hydro-electric progress in Canada by the Hon. Charles Stewart, Minister of the Interior, which shows that with undertakings completed and brought into operation during 1929 and with those which are either under active construction or are being studied for early development, a steadily increasing flow of low-cost hydro-electric energy is assured for Canadian industrial enterprises for the next few years.

The total capacity of new water-power installations completed and brought into operation during 1929 amounts to 378,400 horse-power, bringing the total installation for the whole Dominion to a figure of 5,727,600 horse-power. There are, as well, a number of important undertakings under active construction, which, it is expected, will add more than 1,600,000 horse-power to this total during the next three years. In many of these undertakings an initial installation only is involved and when they are ultimately completed to their full designed capacities, a further 1,500,000 horse-power will be added to Canada's total. Studies are also being made of a number of important projects, some of which will undoubtedly be undertaken within the next few years.

These hydro-electric activities constitute a large part of the building construction program throughout the Dominion and the total outlay of capital involved in the development, transmission, and distribution of the new power developed in 1929 amounted to probably more than \$75,000,000, while not less than \$320,000,000 will be required to complete the undertakings planned for the next three years.

During 1929 Quebec again took the lead in works completed and it is true of the works at present under construction, but important are also under way in practical other provinces.

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CHANGES IN NORTHWEST GAME REGULATIONS

Important Amendments Made to Laws Governing Wild Life Matters in Territories

Hon. Charles Stewart, Minister of the Interior, announces that, by Order in Council, dated November 20, 1929, a number of important amendments have been made to the regulations governing the administration of game in the Northwest Territories. The aim of the Minister is to so regulate the killing of fur-bearers in the Territories that the maximum benefits of these resources can be reaped by the native population. For several years past all officers of the Department of the Interior going into the North have been teaching conservation, and as a result very encouraging progress has been noted by those who have recently visited the Territories.

Probably the most important change in the regulations, following along the line of this educative work, is that respecting the open season for muskrat. The object of this is to encourage the trapper to take the pelt only when it is prime, as at other seasons it is almost worthless. To this end the open season is shortened but, on the other hand, certain restrictions are removed to enable the hunter to get the maximum number of pelts in that season. Hitherto the open season in the southern part of the Territories extended from November 1 to May 15. This has been changed to the period between March 1 and May 31. The open season on white and blue fox, commonly called Arctic fox, in the territory north of timberline, will now extend from November 15 to March 31. A change in the open season for lynx, marten, mink, and fisher is also made, the new dates being November 1 to March 31. The old dates closed the season in mid-March.

A number of other amendments cover the manner of taking game. The law provides that muskrat may not be shot with a shot-gun, as it impairs the value of the pelt, and many animals are wounded and are not recovered by the hunter. Provision is now made to allow under proper supervision aged, infirm, or incapacitated Indians, Eskimos, half-breds or returned soldiers, who are unable to secure muskrats without the aid of a shot-gun, to use such weapon when the muskrat is required for food. Provision is also made permitting meat of moose or caribou, killed during the open season, to be sold or otherwise disposed of at any time of the year for food purposes.

The Thelon game sanctuary east of Great Slave lake, which contains the last known herd of musk-ox on the Canadian mainland, is closed to all, both natives and white men. No person will be permitted to enter this 15,000-square-mile preserve unless he receives written permission from the Minister of the Interior or an officer authorized to grant such permission. The chief object is to protect the approximately 250 musk-ox which are known to have their habitat within this area.

REVIEW OF FOREST SITUATION

Annual Statement by Minister of the Interior—Important Steps to Conserve Canada's Forest Wealth

"The fundamental soundness of Canada's business prosperity has been reflected in the operations of her forest industries during the year just past. Increased volume of trade has more than offset the lower prices which have prevailed for forest products, and there is every reason for believing that the gains made will be augmented during the coming year."

In the foregoing paragraph, Hon. Charles Stewart, Minister of the Interior, opens his review of the forestry situation in Canada in 1929. The statement continues:

"The extremely serious fire season experienced in almost all provinces has focussed public attention on the question of timber supplies. Over one-third of the land area of Canada is suitable only for timber production, but, unless the ravages of fire are very substantially reduced, there is certainly very grave danger that the vast industries dependent on wood will be faced with a serious shortage of raw materials. The situation is aggravated by destructive methods of exploitation which not only militate against a second crop but, by leaving enormous areas of undisposed slash, intensify the fire hazard, and in many cases give rise to conditions under which fire control during abnormally dry periods is well nigh an impossibility. Certainly the whole question of forest fire protection is one with which Canada must cope much more effectively than in the past, and to permit of proper review of the situation, it is my intention to call a conference with the provinces on this matter early in 1930.

"So far as the lumber trade is concerned, the construction and building industries, upon which the domestic market depends, experienced during 1929 a year of unprecedented activity and expansion. Statistics are available only for the first nine months of the year, but these show that the construction contracts awarded comprised an increase of \$62,000,000 over the same period in 1928; building permits provided an increase of \$20,000,000. The indications are that the production of lumber was slightly increased, although there has perhaps been a slight decrease in exports.

"The pulp and paper industry successfully weathered a most critical year. The drastic reduction in the price of newsprint which for a time threatened the prosperity of the industry was counteracted by courageous co-operation, and no branch of the industry was seriously affected. In fact, the newsprint mills were operated at about 85 per cent capacity as compared with 82 per cent in 1928, and it is expected that the total production will show an increase of over 15 per cent as compared with the previous year. Employment has been maintained in the woods and in the mills with little, if any, reduction in wages.

"There has been a considerable decrease in the exportation of pulpwood, although exports still constitute a serious drain on pulpwood supplies. There has also been a slight decrease in the amount of pulp exported, but this has been far outweighed by the

increase of over 15 per cent in the exports of newsprint which comprises the bulk of our exports of paper. In spite of the reduction in price, the value of exports of pulp and paper show an increase of some six or seven million dollars. It is of interest to note that this increase occurred not only in our trade with the United States, but that different parts of the Empire, notably the United Kingdom and Australia, increased their purchases of Canadian paper by between 60 and 70 per cent.

"Canada has further increased her lead among the countries of the world as a producer of newsprint. Whereas in 1928, the production of Canadian mills exceeded that of the United States by 67 per cent, last year the Canadian production was nearly double that of our neighbour.

"In reviews of previous years mention has been made of the menace of exhaustion of timber supplies, particularly pulpwood, and the need for concerted action indicated. I am very gratified to record that a real start has been made during the year just past in the study of this most vital problem. In June last a conference was held with the responsible ministers and chief officers of all the provinces, as a result of which it was decided to conduct on a co-operative basis a national inventory of the forest resources of Canada. It is hoped to complete this task in five years' time, and the information when compiled and analysed will provide the fundamental data so necessary to the development of forest policies suitable to Canadian conditions and oriented to the needs of Canadian forest industries. While necessarily each provincial authority is conducting the surveys of its own resources, the Federal Government through the Forest Service is not only acting as a clearing house for information received, but is conducting special researches into the nature and extent of young growth in the several forest regions of the country.

"It is axiomatic that any forest policy to be effective must conserve the forest capital by restricting the total wastage in the forest, including not only all use by industry, but also all losses through fires, insects, disease and storm, to an amount not exceeding that which is produced in the forest each year through the natural processes of growth. Manifestly, no such policy can be devised lacking essential information with regard to the annual growth in our forests. The Federal Government, in undertaking a comprehensive investigation into this phase of the problem throughout Canada, is making a very effective contribution to the inventory. In addition the Dominion is also accepting responsibility for the conduct of inventory surveys in the Prairie Provinces.

"Viewing Canada as a whole the fire season of 1929 was perhaps the most severe ever experienced in the annals of this country. With the exception of the provinces of Quebec and New Brunswick situations of extreme gravity prevailed for extended periods, in some cases unbroken from spring to late fall. Western Ontario

NEW NATIONAL PARK IN GEORGIAN BAY REGION

Department of the Interior Establishes Recreational Area—Comprises Twenty-Eight Islands

The Georgian Bay region is, perhaps, among the most interesting in Ontario. From a holiday-seeker's point of view, it has almost unlimited resources. For many years now, both the mainland fringing the bay and the Thirty Thousand Islands which dot its surface have been the means of providing thousands of Canadian and United States citizens with summer home and camping sites. The region has gained for itself such a reputation, that the Dominion Government through the Department of the Interior has thought it advisable to permanently set aside a number of these islands as a national park in order to protect the interests of future generations.

Among the twenty-eight islands acquired by the National Parks Branch of the Department of the Interior for this purpose, Beausoleil island is one of the most interesting. It comprises an area of 2,712 acres and not only possesses great scenic beauty but also historic interest. This island figured prominently in the triple battle of St. Louis which was fought in March, 1649, on the Ridge just above the site of the present town of Port McNichol. At that time the Iroquois were bent on driving the other Indian tribes out of the country. Refugees from this battle came to Beausoleil and settled there and in some parts of the island stone foundations and partially demolished chimneys still remain of the buildings they erected.

On June 5, 1856, this land was surrendered by the Indians to the Crown and since then it has been under the jurisdiction of the Department of Indian Affairs. Beausoleil island is admirably suited to park purposes. Its beautiful shade trees and cold spring water have attracted picnic and camping parties from the surrounding districts for some years past. This new national park is easily accessible by boat from either Midland or Penetang, Ontario.

and the northern parts of Manitoba and Saskatchewan were the most affected by adverse conditions. The fire season of the previous year, instead of dying down normally in the fall extended right through till late December. The winter's snowfall was extremely light and the whole northern area dried up in April and remained in a parched condition until November. In Alberta and British Columbia the period of high fire hazard developed only during the summer months, but reached extreme severity during August and early September.

"Unfortunately, we are still too near in point of time to the close of the season to allow of a comprehensive survey of what actually transpired. After a season of such severity, it takes the forestry authorities some considerable time to piece together the results. Consequently, the detailed records and statistics both as to number of fires and losses are not available at this date. We do know, however, in general, that the number of fires occurring was unprecedented; but that, as compared

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NATURAL RESOURCES CANADA

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HON. CHARLES STEWART,
Minister

W. W. CORY, C.M.G.,
Deputy Minister

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OTTAWA, JANUARY, 1930

PROGRESS IN DEVELOPMENT OF CANADA'S NATURAL RESOURCES

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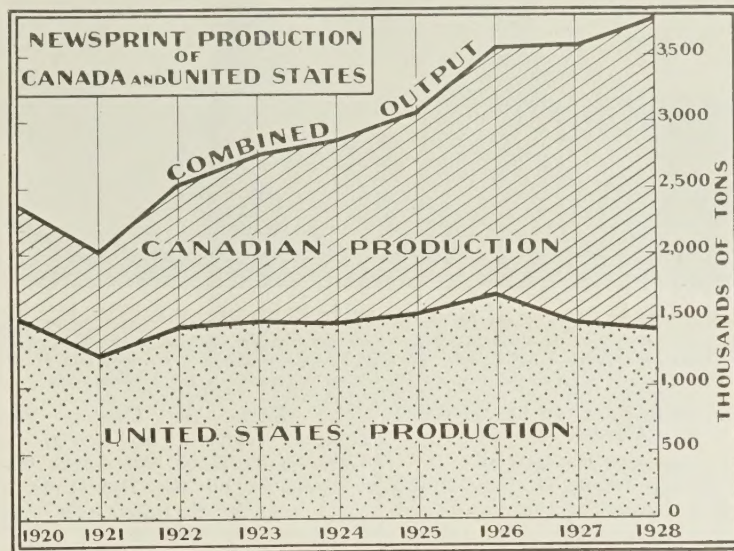
cent above the splendid record established last year.

The Alberta petroleum and natural gas resources have now been developed to the point where they are no longer considered of problematical value but are classed among the great wealth producers of the country. The total production of naphtha, light crude, and heavy crude oils has now reached an annual total of well over 1,000,000 barrels or 105 per cent increase over last year.

Forestry.—Our forest industries continue on a high level of activity. A number of steps have been taken in the year to still further promote that progress. The most important of these is the arrangement arrived at by which the provinces and the Dominion will co-operate in the basal work of making a detailed inventory of Canada's forest resources.

The unusual severity of the fire season in 1929 has been a practical though costly illustration of the great danger which threatens our forest resources in seasons of high fire hazard. Though the lesson has been carried to the public in many ways during the last eight years through the publicity efforts of the Forest Service, the results as regards the curtailment of preventable forest fires have not been as satisfactory as is necessary if Canada is to balance her average annual cut of 2,700 million cubic feet of standing timber with natural increment. Science is working to promote better methods of utilization, and to reduce losses through insects and decay, and the organized fire-fighting forces are confident that they can adequately cope with any situation due to natural causes. It is as regards the preventable fires that public co-operation is so necessary. Each year the industries dependent for their raw materials upon the forests call for greater supplies. The value of the production for the group of manufacturing industries using wood and paper as their principal component materials was in round figures \$630,000,000 for 1927, the last year for which complete returns are available. This compares with \$600,000,000 for 1926 and \$557,000,000 for 1925. Nevertheless Canada has sufficient readily accessible forest land to produce in perpetuity several times the present annual cut, and to sustain forest products industries of much greater capacity than exist to-day, provided the preventable losses and unnecessary waste referred to are overcome.

CANADA'S LEAD IN NEWSPRINT FIELD



The accompanying diagram, based upon figures published by the News Print Service Bureau, indicates the remarkable change that has taken place during the last decade in the relative status of Canada and the United States as producers of newsprint. In 1920 Canada accounted for barely 37 per cent of the combined output of the two

countries. In 1926 the Canadian output for the first time surpassed that of the United States, and, since then, has steadily increased its margin of leadership. By 1928 Canada's contribution to the combined production exceeded 60 per cent, and it should closely approach two-thirds of the total for 1929.

Water-Power.—Water-power, which has given such impetus to our industrial life, has developed to an extent that a few years ago would have been considered phenomenal. The new construction during the year brought the total installed horse-power to 5,727,600. This is an increase of 7 per cent for the year and the completion of work now under way will, in three years, add about 28 per cent to the present total. The cost of this year's construction was, in round figures, \$75,000,000 and for the coming three years will be more than four times that amount. Developments cover practically all the provinces and all lines of industry, with a marked widening of the use of power in the domestic, municipal, mining, and agricultural fields.

Questions of considerable importance are becoming more frequent in connection with International Boundary waters. As Minister of the Interior, I am charged with the responsibility of advising on these matters. Canadian interests must be adequately safeguarded and to achieve this end it has been necessary during the year for the proper officers to give increased study to the legal and technical questions involved.

Tourist Trade Development.—The business created by the influx of tourists, which only a few years ago was insignificant, has now risen to the proportions of a major industry. The number of tourists entering Canada was larger in 1929 than ever before and the total value of the trade has been conservatively estimated at over \$300,000,000.

As I have previously pointed out this is not the whole benefit which we receive. Canada has so much to offer that every tourist is a probable investor and a possible settler; in any event he becomes a better friend of this country than before, which means much to every Canadian interest. A pleasing feature of this trade is that it is in its infancy and much of the work carried on for the benefit of Canadians, by the Department of the Interior, tends to attract tourists. Our national parks, which are being constantly improved, have now a world-wide reputation and draw yearly increasing throngs of seekers after health

and pleasure—sportsmen, holiday-makers, nature lovers, and mountain climbers. The setting aside of bird sanctuaries, shooting grounds, and historic sites, and the development of both summer and winter sports has also added to Canada's already great drawing power.

Conclusion.—Perhaps the most significant feature of Canadian development in the past year has been its clearly defined northward trend. The majority of the homestead entries have been recorded at Prince Albert, Edmonton, Grande Prairie and Peace River, indicating that settlers are going into the fertile park lands in and north of the Saskatchewan valley and into the Peace River country.

North of the Prairie Provinces there has been greater exploratory and prospecting activity than ever before. The native inhabitants, Indians and Eskimos, whose aid will prove invaluable in development work must be protected and maintained in health and numbers. To this end, during the year plans were completed for bringing a herd of 3,000 domesticated reindeer from Alaska to the Mackenzie valley and for instructing natives in the work of herding. It was for this purpose too, that the officers of the Department of the Interior and the Royal Canadian Mounted Police completed patrols totalling 50,000 miles by boat, canoe, and dog train. Among much other work measures were taken to safeguard the musk-ox which it is believed will result in again building up the herds of this most useful northern animal. A survey of wild life on the islands of James Bay was completed and further investigation was made of the mineral possibilities of the Coppermine River area.

Surveying dispassionately and even critically these broad fields of endeavour, it is impossible not to see how great have been the strides and steady the advance in the year just closing, and how strong are the grounds for a sane and reasoned optimism as to the progress of the Dominion in the year upon which we are now entering.

MILLION-BARREL OIL PRODUCTION FOR ALBERTA

(Continued from page 1)

the deeper naphtha horizons and casing off the light crudes encountered above. There is evidence, however, that this practice is becoming modified and that in consequence the shallower sands will be more systematically exploited in the future, with corresponding increase in the light crude production.

"The increase in heavy crude production is very encouraging as showing the appreciation of this class of development, which appears to be capable of steady production for considerable periods. The comparative production figures of the different grades for the past five years are as follows:—

	Naphtha brls.	Light Crude brls.	Heavy Crude brls.	Total brls.
1925...	165,717	2,926	....	168,643
1926...	211,008	2,609	5,981	219,598
1927...	290,270	38,808	3,055	332,133
1928...	410,623	70,734	8,174	489,531
*1929...	826,968	62,950	12,308	902,226

* Eleven months.

"The total consumption of gas from all Alberta fields for the nine months' period ending September 30, 1929, amounted to 15,145,516 thousand cubic feet. The considerable surplus of gas from Turner valley enabled the quantity drawn from Bow Island and Foremost fields to be reduced to a minimum and these fields to be held in reserve for future use. Towards the close of the year an important strike of dry gas was made at Kinsella, thus adding a new potential reserve to the area from which Edmonton and other cities draw their supply.

"Indicative of the impetus given to solid development by the advent of capital during the year is the amount of deep well drilling and prospecting that is under way. During the nine months ending September a total of 310,105 feet was drilled, of this amount 94,710 feet being to the credit of the rotary water flush system."

REVIEW OF FOREST SITUATION

(Continued from page 2)

to previous years of high hazard, the losses resulting from these fires were relatively much lower. This result has been due to increased efficiency all along the line, and Canada has come through the fire season of 1929 optimistic that efforts can be made adequate to cope with forest fires under all conditions, provided the necessary public support is secured. This is perhaps the outstanding lesson of 1929 because previous abnormal fire years engendered the pessimistic attitude amongst the forest authorities affected, that they were, after all, facing uncontrollable conditions. That attitude has been dissipated and has been replaced by a certainty that Canada can, if she wishes, vanquish the fire-fiend.

"On the other hand, this lesson has also been learned, namely, that we must intensify our efforts in fire protection, in prevention through public education and elimination of hazards, as well as in detection and control by the use of every modern facility that science can employ. The forests of Canada provide large revenues, and it is obvious that a greater proportion than hitherto of the value secured must be turned back into the forests for their protection and proper administration."

MINING PROGRESS IN CANADA IN PAST YEAR*

Advancement Along Many Lines—Estimate Value of Year's Production at \$300,000,000

The rising public interest in mining has been reflected in 1929 in special legislative and administrative action. This included an extensive revision by the Dominion Government of the Quartz Mining Regulations; a large amount of new legislation in British Columbia; the creation of a new department by the Manitoba Government; increased activities by the Government of Ontario; the addition of a geological branch to the Quebec Bureau of Mines, and the appointment of a provincial mineralogist in New Brunswick.

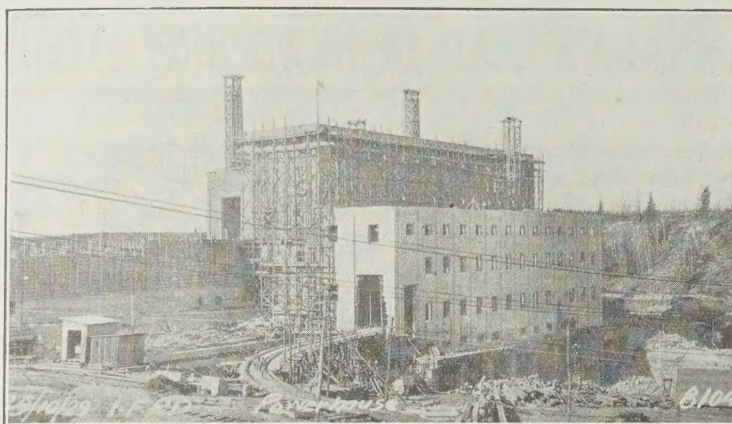
There has been a marked tendency towards co-operation on the part of the larger mining and metallurgical groups, principally to eliminate duplication in exploratory work and in the smelting and refining of ores, and during the year arrangements of this kind have been entered into between a number of the larger Canadian operators. Methods of financing new mining enterprise, which have also received special consideration in the last few years, have been featured by the formation during the year of two large new concerns which propose to specialize in this field.

Closer contact has been made with the newer mineral districts of the North by the increasing use of modern methods of transportation. In this the airplane and motor tractor have continued to play significant parts both in eastern and western regions of the northlands. Much activity is also seen in the development of water-power resources to meet the growing needs of the mining industry in the older districts as well as in those of the North.

Prospecting has been decidedly active throughout the year, and new discoveries of apparent importance have been made at Opemiska lake, Quebec; east of lake Athabasca in Saskatchewan; in the Northwest Territories immediately south of Great Slave lake; and on the Peel river in the Yukon. Substantial development operations have also been carried on in such areas as Taku Arm, Nimpkish, and the Kootenays in British Columbia; northern Manitoba; the Patricia district and the Sudbury and Bellevue areas of Ontario, which should lead to the establishment of new mines. Of interest, also, were discoveries of stannite and cassiterite (ores of tin) in British Columbia; of chromite at Obonga lake, Ontario; and of beryl (a source of the metal beryllium) in south-eastern Manitoba.

Exploration and development of earlier discoveries have been pushed forward and although success has not attended every venture the results obtained in many cases have been very satisfactory. In the Moose River basin drilling operations by the Ontario Government have revealed a lignite deposit containing at least some 40,000,000 tons, and which up to October 1 had been found to average twenty feet in thickness over an area of two square miles. Diamond drilling at Chibougamau lake

*Prepared at the direction of Dr. Charles Cammell, Deputy Minister, Department of Mines, Canada.



Canada's Water-Power Development—As will be seen from the above recent photograph of the power-house at the Island Falls development on the Churchill river, Saskatchewan, good progress is being made. By early autumn of 1930 it is expected that 42,000 horse-power will be available to supply mining enterprises in the Flinflon area.

HYDRO-ELECTRIC DEVELOPMENT IN CANADA IN 1929

(Continued from page 1)

In British Columbia, the British Columbia Power Corporation, through its subsidiaries, commenced construction of a new 188,000 horse-power development at Ruskin on the Stave river, advanced construction of the large Bridge River project which is expected to come into operation in 1932 with an initial installation of 80,000 horse-power, and completed an automatically operated plant of 2,000 horse-power at the Jordan River diversion dam on Vancouver island. The City of Nelson added 3,000 horse-power to its plant on the Kootenay river and the Powell River Company commenced work on an 18,000 horse-power development on Lois river. Other large developments are contemplated by the West Kootenay Power and Light Company on the Adams and Pend d'Oreille rivers, by the British Columbia Power Corporation on Campbell river, and by the East Kootenay Power Company on the Elk river.

suggests the existence of one or two bodies of copper ore of commercial consequence. Several promising prospects are being explored in the Patricia district of Ontario, and development is actively going forward from James bay westward to the Yukon, and notably at the Flin Flon and Sherritt Gordon properties in Manitoba and at the lead-zinc deposits south of Great Slave lake. A number of older mines have been re-opened in British Columbia, and development work is also proceeding rapidly at the Frood, Noranda, Amulet, Errington, Falconbridge, Howey, and a number of other properties in Ontario and Quebec.

Concentrating, milling and metallurgical facilities, have been greatly expanded, notably in the Sudbury and Kirkland Lake areas of Ontario, in northern and southern British Columbia, and in the Rouyn district of Quebec. Milling and metallurgical plants are also being constructed at the Flin Flon mines, at the Amulet in western Quebec, and at the Stirling mine in Nova Scotia.

Forecasts received from the various mining provinces indicate a material increase in the total mineral production of the Dominion. Ontario estimates its output for 1929 at \$110,000,000, and the British Columbia authorities forecast a production valued at \$70,000,000. From these estimates and the known activities in the other provinces it would seem that the total mineral production may reach a new high record in 1929, with a value of approximately \$300,000,000.

In Alberta the Calgary Power Company completed and brought into operation its 36,000 horse-power Ghost development on the Bow river and widely extended its transmission system throughout the province.

In Saskatchewan good progress was made with the construction of the Island Falls development of the Churchill River Power Company which will bring 42,000 horse-power into operation in 1930 to supply the Flin Flon and Sherritt Gordon mines.

In Manitoba the Northwestern Power Company advanced construction on the 225,000 horse-power Seven Sisters development on the Winnipeg river which is expected to come into operation with 112,500 horse-power capacity in July, 1931, while the Slave Falls development of the City of Winnipeg on the same river was commenced. The city plans to bring 25,000 horse-power into operation at this plant in 1931, the designed capacity being 100,000 horse-power.

In Ontario the Hydro-Electric Power Commission completed a 2,200 horse-power development on the South Muskoka river at Trethewey Falls, one of 1,800 horse-power at Elliott Chute on the South river, and one of 5,000 horse-power at Lower Ear Falls on the English river. Work was also advanced on the 54,000 horse-power development at Alexander Landing on the Nipigon river, on the installation of a tenth unit of 58,000 horse-power in the Queenston station on the Niagara river, and on the duplication of the 220,000-volt transmission line bringing Gattineau River power to Toronto. The Commission took an additional 76,000 horse-power during 1929 under its contract with the Gattineau Power Company. A new contract for 250,000 horse-power was also made with the Beauharnois Light, Heat & Power Company, delivery to commence in 1932. In northern Ontario the International Nickel Company of Canada completed its 28,200 horse-power development at Big Eddy dam on the Spanish river and the Algoma District Power Company brought into operation a new plant at High Falls on the Michipicoten river with an initial installation of 11,000 horse-power.

In Quebec the Gattineau Power Company added one unit each to its plants at Chelsea and Farmers on the Gattineau river of 34,000 horse-power and 24,000 horse-power respectively, and a unit of 25,000 horse-power to its Bryson plant on the Ottawa river. The Shawinigan Water and Power Company added a 43,000 horse-power unit to its Shawinigan Falls plant, and

CANADA REGAINS WORLD'S WHEAT CHAMPIONSHIP

Also Scores Heavily in Other Events at International Live Stock and Grain Show

At the International Live Stock Exhibition and Hay and Grain Show at Chicago in December, 1929, Canada again carried off the wheat championship of the world. This honour went to Mr. Joseph H. B. Smith, of Wolf Creek, 140 miles west of Edmonton, Alberta. Thirteen other championships and reserve championships in live stock, hay and grain were won by Canadians this year. During the nineteen years that this exhibition has been held, Canadian farmers have won the wheat championship fifteen times. Ten times the award has gone to Saskatchewan, four times to Alberta, and once to Manitoba.

It is to be noted also that this wheat prize carried with it another honour to Canada. The winning sample was Reward wheat, a variety developed at the Central Experimental Farm, Ottawa, and first placed on the market in commercial quantities in 1928. It is a cross between Marquis and Prelude, and it ripens in 100 days as compared with 114 required for Marquis.

On the four occasions in the past nineteen years when Canada has not won the wheat championship it has gone to the northern border state of Montana, U.S.A. This circumstance again calls attention to the conclusion of scientists and of practical farmers that in the northern hemisphere the southern portions must ever look to the north and the still further north for their seed and their foundation live stock, in order to maintain the stamina and yielding qualities of their plants and animals.

a new development of 72,000 horse-power capacity was brought into operation on Des Prairies river near Montreal by the Montreal Island Power Company. The City of Sherbrooke brought into operation a new plant of 5,800 horse-power at Westbury on the St. Francis river and the Southern Canada Power Company one of 2,000 horse-power at Ayers Cliff on the Nigger river. Other smaller installations were also completed during the year in various parts of the province. Among large projects under way are those of the Alcoa Power Company on the Saguenay river with an initial installation of 260,000 horse-power, the Beauharnois Light, Heat & Power Company on the St. Lawrence river with an installation of 500,000 horse-power, and the James MacLaren Company on the Lievre river with an initial capacity of 90,000 and an ultimate designed capacity of 120,000 horse-power. The Shawinigan Water and Power Company is also planning further large developments on the St. Maurice river.

In New Brunswick the Saint John River Power Company added the second and third units of 20,000 horse-power each to its Grand Falls development on the Saint John river and the Bathurst Power and Paper Company added a 5,500 horse-power unit to its plant on the Nipisiguit river.

In Nova Scotia the Nova Scotia Power Commission completed three new plants on the Mersey river with installations totalling 30,900 horse-power and one on the Tusket river with 3,000 horse-power. The Avon River Power Company completed a development of 500 horse-power on the Fall river and commenced construction of a new 4,500 horse-power plant on the Black river.

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TREE PLANTING ON PRAIRIE FARMS IN WESTERN CANADA

SHELTERBELTS HAVE IMPROVED SETTLERS' HOMES

Free Distribution of Trees by Department of the Interior Began in 1901—Its Growth

No single factor has tended more to foster the building of comfortable and artistic farm houses and the creating of homelike surroundings on Canadian prairie farms than the development of tree-planting. While it is difficult to determine the money value of shelterbelts to the farmers of Western Canada, the benefits which are derived from the protection of trees are quite apparent. Until the middle of the last decade few farmers grew their own vegetables, other than potatoes. As shelterbelts increased so did gardens and now most kinds of vegetables, including the more delicate varieties, are being raised, while small fruits and even tree fruits, as well as flowers and ornamental shrubs, are being successfully grown.

Tree planting on the prairies had its inception in the natural desire of settlers from Eastern Canada to beautify their new homes with trees and shrubs. However as much of the stock they used was brought with them, or sent to them, from the East, success under the different conditions of soil, moisture and temperature in the West was rare. Continued failures led to the widespread belief that trees would not grow on the prairies. However a few undaunted spirits planted native stock brought from nearby coulees and in this way a beginning was made in improving the surroundings of western farm homes.

The Department of the Interior, realizing the benefits to be derived from tree planting, began in 1901 the production and free distribution to farmers of seedlings and cuttings of such species as were deemed hardy enough to meet the peculiar conditions on the prairies. These were shipped out in quantities large enough to enable each applicant to establish a practical system of shelterbelts around his exposed buildings and gardens. This distribution has continued in increasing numbers each year and to date well over 100,000,000 trees have been sent out.

In practically every case where instructions for preparing the soil and planting have been followed and proper care taken of the young trees, success has resulted. It is estimated that about 80 per cent of the plantations have been completely successful, partial failures and total losses being largely due to neglect.

(Continued on page 4)

AERIAL SURVEYING DURING 1929

Great Areas in Canada Photographed For Mapping and Other Purposes—Extend Aeroplane's Usefulness

With the end of the flying season of 1929 and the return of the planes to their winter quarters it is now possible to summarize the aerial work performed by the Royal Canadian Air Force for the various services of the Department of the Interior. Ever since the war there has been the closest co-operation between the Air Force and the Department of the Interior and

In all eight detachments of two machines each were used last season and the aggregate flying time totalled more than 3,400 hours. Activities extended from Nova Scotia on the east to British Columbia on the west and included work in every province. In all about 70,000 square miles were covered by aerial photographs of which 24,000 square miles were vertical photo-



Photographing Canada from the Air—A view of Edmundston, New Brunswick, taken from a Royal Canadian Air Force plane during photographic operations in Eastern Canada last summer.

while originally this Department's aerial activities were largely confined to forest patrol and aerial photography, of late years it has been found that the aeroplane can be used by many other services in their scientific work and in the administration of Canada's natural resources.

The results obtained during the season of 1929 were more than usually successful in aerial photography. These aerial photographs are used not only for mapping but for water-power investigations, timber cruising and estimating, geological investigations, and various engineering purposes. In fact, the aerial photographs provide the means for assisting in a material way the ultimate analysis of the resources of a district. As an example this year an area of over 4,000 square miles was photographed in northern British Columbia for the purpose of taking stock of its natural resources. The preliminary reports indicate that this work was so satisfactory that a wide field of usefulness has been opened up for aerial reconnaissance.

graphy and 46,000 square miles oblique. Vertical photography is used by the Topographical Survey to map rough country or where great detail is required, while the oblique photography has a field of its own in mapping and exploring our great hinterland.

Canada has for years led the world in aerial surveying and during the past season has consolidated that leadership by applying, for the first time in any country, aerial methods to geodetic reconnaissance and transportation. This has been done with a very marked saving both in time and money, particularly as the work has been largely done by aeroplanes on photographic operations in weather which was unsuitable for photography and when otherwise the planes would have been idle. In all more than 300 hours were flown for the Geodetic Survey of Canada giving an increase of about ten per cent in the utilization of the photographic machines at no expense for equipment or personnel. This increase, however, tells only part of the story as two-thirds of the geodetic work was done by

(Continued on page 3)

INVESTIGATIONS ALONG ARCTIC COAST COMPLETED

MAJOR BURWASH RETURNS FROM CANADIAN NORTH

Favourable Conditions Among Eskimos East of Mackenzie—Examined Coppermine River Mineral Reserve

Generally favourable conditions among the natives along Canada's Arctic coast between the mouth of the Mackenzie river and Boothia peninsula are reported by Major L. T. Burwash, of the North West Territories and Yukon Branch of the Department of the Interior who recently returned after nearly eighteen months spent along the Dominion's northern coast. Major Burwash covered approximately ten thousand miles during the prosecution of his various investigations and examinations, travelling by schooner, dog-team, and on foot. In addition to his report on the state of the Eskimos, Major Burwash brought back valuable information on wild life matters and on the mineralized areas contained within the Coppermine River reserve, and a record of his observations at the north magnetic pole.

Satisfactory conditions prevailed among the natives east of the Mackenzie delta during the past eighteen months according to Major Burwash. There were no epidemics, food was plentiful, and the fur catch was reasonably good. Among the Eskimos of the King William Island and Boothia Peninsula areas there was a striking evidence of the trend towards the adoption of the white man's mode of living. Heretofore the natives of this part of Canada's Arctic coast were very much isolated and were consequently not so far advanced as the Eskimos of the Mackenzie delta. However the establishment of wireless stations by the Hudson's Bay Company at Cambridge Bay, Victoria island, and Gjoa Harbour, King William island, the maintenance of a regular supply service along this part of the coast, and activity in mineral exploration have left their mark in the changing life and customs of the natives.

Major Burwash left Ottawa in June, 1928, en route to Aklavik at the mouth of the Mackenzie river from which point he began his work in the North. Accompanied by an assistant, he sailed from Aklavik in the Department's forty-foot power schooner, *Ptarmigan*, on August 3, 1928. The expedition touched at Baillie, Horton River, Pearce Point, Inman River, Bernard Harbour, and later at Cambridge Bay,

(Continued on page 2)

PACIFIC COAST SALMON A VALUABLE RESOURCE

Annually Adds Millions to Value of
Dominion's Production—Five
Varieties Marketed

Pacific Coast salmon constitute one of the most valuable of Canada's natural resources and year after year the great harvest of these fish adds millions of dollars in value to the Dominion's production. In 1928, for instance, the value of British Columbia's catch of salmon was more than \$17,300,000. The importance of the Pacific salmon fishery in Canada's commerce is further indicated by the fact that British Columbia canned salmon was exported last year to thirty foreign countries, and there was also export of salmon in other forms.

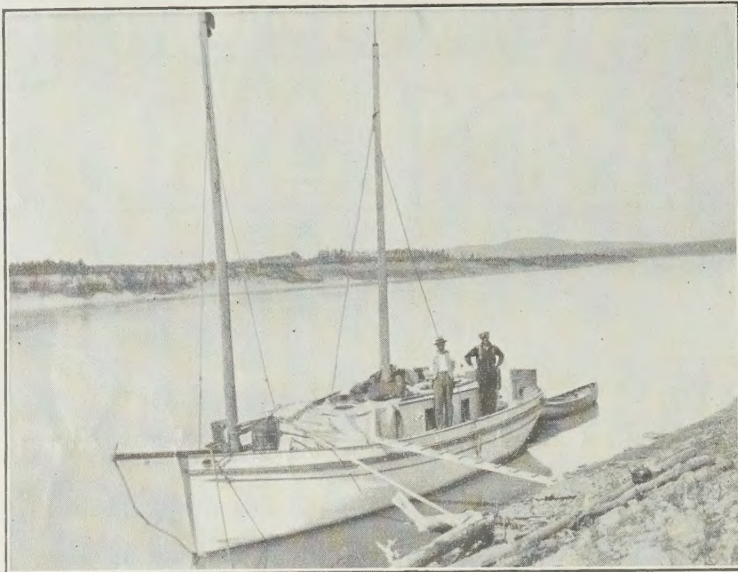
Five principal varieties of salmon are caught in British Columbia waters—sockeye, spring, coho, pink, and chum. All are of much the same food value, but the sockeye, because of the rich red colour of its tissue, is most popular and brings the highest price. In average weight Pacific salmon range from the approximate twenty pounds of the spring down to the four pounds of the pink.

Although they are all members of the one family the several varieties show interesting differences in length of natural life span. The pink, for example, lives only two years; the spring, six or seven; the coho, three; the chum, four; and the sockeye, four to five. Unlike the Atlantic Coast salmon (*Salmo salar*), which spawn several times, the Pacific salmon (*Oncorhynchus*) spawn but once and die immediately thereafter at the river spawning ground. An interesting fact in regard to these fish is that salmon hatched in a particular river return to the same stream to spawn.

The principal means used by British Columbia fishermen for catching salmon are gill nets, purse seines, traps, and troll lines. Traps, which are large stationary devices of heavy piling and nets built out from shore, are permitted only in the strait of Juan de Fuca, so far as Canadian fishing is concerned, though they are much used in United States waters.

As their name indicates, gill nets are nets in which the mesh is of such size that fish swimming into them are caught and held by the gills. The purse seine is a net which is used for surrounding schools of fish. When a school of salmon is sighted by a fishing boat, one end of the seine is put overboard and fastened to a stationary rowboat; then the fishing boat circles around the fish, paying out the net steadily, until both ends of the seine have been brought together again; this done, the bottom of the seine is closed or "pursed" by means of ropes which run down from the top, the net is hauled up, and the fish are removed to the boat. Trolling is done by using lines put out from a rowboat or motorboat which draws them through the water as it moves along.

A large part of British Columbia's salmon catch is canned for marketing. In 1928, when the total catch was some 225,745,000 pounds, about 98,000,000 pounds, valued at over \$13,750,000, were canned and the year's pack—2,035,637 cases—was the largest, with one exception, in the history of the province. More than 25,000,000 pounds of salmon were marketed in the fresh state, slightly more than 17,000,000 pounds were dry-salted, and the remainder of



Investigations Along Canada's Arctic Coast—The forty-foot auxiliary power schooner, *Ptarmigan*, on Great Bear lake before it was taken down the Mackenzie river to Aklavik. Major L. T. Burwash used this craft on his eastward voyage along the Arctic coast.

INVESTIGATIONS ALONG ARCTIC COAST COMPLETED

(Continued from page 1)

Victoria island. Ice conditions greatly retarded progress in Queen Maude gulf and the 300-mile voyage along its southern shore required 22 days.

Winter quarters were established at Gjoa Harbour on King William island. An overland trip was begun on December 1 to the northeast to Oscar bay, a distance of about 100 miles, where the Hudson's Bay Company's steamer, *Fort James*, was wintering. Igloos were built and food cached along the route so as to keep open the line of communication

the catch was sold in the form of the mild-cured, pickled, and smoked products.

Since conservation of such a valuable natural resource as the salmon is obviously of first rate national importance, the Fisheries Branch, Department of Marine and Fisheries, enforces various regulations as to fishing appliances and close seasons. At the same time, through its Fish Culture Division, it is continually aiding Nature by stocking British Columbia waters with salmon fry or eyed eggs from the hatcheries it maintains in the province. In order to assist the fish in reaching spawning grounds, fishways are built on streams where waterfalls make them necessary.

Salmon fishing is in progress somewhere in British Columbia at virtually all times of the year, except the month of December, but it does not go on continuously in all parts of the province. Seasons vary in different districts. In all districts, all through the fishing periods, a close "season" of at least forty-eight hours each week is enforced; and in cases in which there is doubt that sufficient fish are escaping to the spawning grounds this weekly close season is extended by as many hours as seems desirable.

As has been noted in an earlier paragraph, the use of traps, which are very effective devices for taking salmon, is permitted in the strait of Juan de Fuca only, so far as Canadian waters are concerned. Gill-netting and seining and trolling are carefully regulated in such ways as experience has shown to be best. Drag seines, by which salmon could be taken in large numbers in certain areas, may not be used by any fishermen except Indians, and then only at a few specified points and under strict conditions.

with the ship which, through its powerful wireless equipment, provided the only means of communication with the outside world. A second trip was made in March and a third in April, both of which were extended forty miles to the site of the magnetic pole where observations were made. In April, Major Burwash received instructions from Ottawa by wireless to return westward and make an examination of the mineralized areas of the Coppermine River and Bathurst Inlet region.

In order to make an early start it was necessary to leave the *Ptarmigan*, which was still frozen in, and proceed by dog team. A beginning was made on the long trip to Bathurst inlet on May 17. This journey, because of snow-blindness among the members of the party, great scarcity of dogs, and accidents by the way, was a most arduous one and Wilmot island at the mouth of the inlet was not reached until June 16. An interesting event on the trip was the meeting with two Eskimos carrying to King William island the winter mail which contained letters for Major Burwash which left Ottawa the preceding November. From Wilmot island, notwithstanding the unfavourable travelling conditions, an examination was made of the mineralized areas around Bathurst inlet. Very promising deposits of copper in place were noted during this survey.

Toward the end of July a schooner reached Wilmot island and Major Burwash went to the Coppermine River area, where three weeks were spent in the region inland from the coast. Considerable loose copper was observed in the glacial drift indicating the possibility of a prolific source at a considerable distance to the northeast. After completing his survey, Major Burwash proceeded to Cambridge Bay on the Hudson's Bay Company's steamer, *Baychimo*, in connection with his other duties and then returned to Bathurst inlet. Early in December he started south by aeroplane for Winnipeg, later proceeding to Ottawa to make his report to the Department of the Interior.

Canada's Coke Production

Coke is being produced in Canada chiefly by the treatment of bituminous coal; a small production is also obtained from the distillation of petroleum. Coke derived from the treatment of coal or petroleum is now produced in almost every province of the Dominion.

MAGNETIC SURVEY OF ALBANY RIVER

Dominion Observatory Party Extended Work
During 1929 Field Season

In that part of its work respecting the earth's magnetism, the Dominion Observatory, Ottawa, during the field season of 1929, extended its scientific magnetic survey of Canada to include the Albany River district of northern Ontario. For this purpose the Observatory party travelled by canoe from lac Seul down the Albany river to James bay and returned up the Abitibi river to the end of steel of the Temiskaming and Northern Ontario railway, north of Cochrane. The canoe part of the journey covered 925 miles and with the time spent in taking observations occupied a little more than three months. From lac Seul, which is a fine body of water, the route led up the Root river necessitating ten portages to the height of land, over which there is a portage to lake St. Joseph. Lake St. Joseph is 75 miles in length and is the source of the great Albany river which, starting from the eastern end of the lake, rushes tempestuously to the sea 500 miles away, dropping in its course no less than 1,200 feet.

Between lake St. Joseph and Martin falls, a distance of approximately 225 miles, the Albany is rough and turbulent, with 28 portages. This section of the river was especially difficult to navigate during the past season on account of a shortage of water as a result of a dry season. Many of the rapids were too shallow to run, and were descended by wading, in order to lighten the canoes which were drawing only eight inches of water. Near Martin falls the river for several miles leaps downward in a series of cascades which, viewed from above, resemble steps of a giant's staircase. Below Martin falls no portages occur. The river rushes headlong towards James bay, and after being joined by the Kenogami gradually widens out into a mighty waterway. The banks of the Albany are thickly timbered and the fertility of the soil is evidenced by the excellent gardens found at all the trading posts. The river teems with fish and the country is the home of moose, deer, bear, and many smaller animals.

Travel by canoe on James bay, it was found, offered no difficulties when the weather was fair. Along the coast between Fort Albany and Moose Factory there is a six-foot tide. When the tide is high it is possible to hug the shore, but at low tide it is necessary to stand off at distances varying from one to five miles. This is due to the presence of extensive rocky shoals and reefs. The terrain, a short distance inland, is high and heavily wooded. The marshes that skirt the beach are the feeding grounds for thousands of ducks and geese.

The object of the survey was to establish magnetic stations along the route at points approximately one hundred miles apart. Ten such stations were occupied. A similar survey of this region was made in 1913 and four of the stations then established were exactly reoccupied and three approximately. The observations taken at these repeat stations are not only of immediate practical value to all users of the magnetic compass, but furnish data of importance for investigations into the causes of the earth's magnetism, a subject as yet far from being fully understood.

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HOPE TO SOLVE FATE FRANKLIN EXPEDITION

Department of the Interior Secures Interesting Documents Which May Advance Search

For over three-quarters of a century the fate of Sir John Franklin, and of the 128 officers and men of his expedition, has been wrapped in mystery. Events of the past few months have given rise to the hope that additional light may be shed upon the details of that heroic adventure, by the aid of documents and sketches which Hon. Charles Stewart, Minister of the Interior, has acquired for the use of the Department, after an investigation by Mr. O. S. Finnie, Director of the North West Territories and Yukon Branch.

Sir John Franklin's expedition sailed into the Arctic in 1845 in the two ships, *Erebus* and *Terror*. The ships were seen by a whaler near the entrance to Lancaster sound on July 26 in that year and from that time neither the ships nor any members of their crews were seen again by white men. In 1854 Doctor John Rae, an officer of the Hudson's Bay Company, found a band of Eskimos who said they had seen white men travelling painfully southward along the shore of King William island and that these men had all died. In 1859 Captain Leopold M'Clintock found in a cairn at Victory point, near the northwest angle of King William island, a printed Admiralty form on the margin of which was written, over the signatures of Captains Crozier and Fitzjames, the commanders of the two ships, a few terse but very expressive sentences. These conveyed the information that Sir John Franklin had passed away on June 11, 1847, that eight other officers and fifteen men had died, that the ships had been abandoned, and that the remainder of the expedition, 105 persons in all, would start the following morning (April 26, 1848) for Back river on the mainland. Although many other expeditions have sought for Franklin this is the only record that has been found of the ill-fated party.

It has always been held by authorities on exploration that important records of the expedition must have been deposited by the survivors before the effort to reach civilization by way of Back river was begun, and that the most probable place was in the grave

CANADA'S INTERNATIONAL SUCCESSES IN WHEAT

The successes of Western Canadian farmers in international wheat competitions, within a period of nineteen years since the institution of the award in 1911, constitute one of the most impressive features in the records of Canadian agriculture. On fifteen occasions, the Dominion's representatives won against all North America with exhibits of

such competitions is, first and foremost, a tribute to the talent of the exhibitor. But their work has done more than that—it has brought renown to the West, and to the whole Dominion.

And it is a matter of gratification that this notable series of successes has not been monopolized within any restricted area. As the accompanying



hard red spring wheat and in addition in two other years they carried off the prize for the best hard red spring wheat, although in the two years just referred to they lost the grand championship to hard red winter wheat by a narrow margin. The work of these 'master farmers' has brought them high personal distinction, for the winning of

map indicates, the locations of the Canadian winners of the highest honours in North American wheat competitions are remarkably well and widely distributed throughout the vast area of wheat-growing territory in the Canadian West. The Prairie Provinces furnish a far-flung habitat for wheat of premier quality.

of the leader. The Department of the Interior would not at this late date, be justified in equipping and sending out an expedition to search for the grave of Sir John Franklin but with the development of Canada's northland, departmental officers concerned with the care of the native population, are continually patrolling through that portion of the Arctic and it would be an inexpensive matter for them to devote a little time to searching for records which would be of the greatest value to Canada and to the Empire. Therefore, when, a short time ago, Hon. Charles Stewart was appraised that documents were in existence which purported to give the location of Franklin's grave, he directed that the matter be carefully investigated, and as a result the papers and maps have been purchased for the Department.

These papers consist of a lengthy manuscript accompanied by maps prepared, many years ago, from the statements of a member of the expedition headed by the United States explorer, Charles F. Hall. This expedition spent the period from 1864 to 1869 in the North engaged in the search for Franklin. According to the statement, Hall's expedition broke up in disorder owing to internal troubles and on that account this valuable information was lost to the head of the expedition.

Explorers of the Department of the Interior have frequently visited King William island in the course of their regular duties but in practically every case they have been there in winter when everything is covered with ice and snow and, besides, the documents indicate that the graves are in a locality which is not ordinarily traversed by departmental officers, or others.

The study of these documents is being continued and at the first opportunity when an explorer of the North West Territories and Yukon Branch is in that part of the Arctic he will be instructed to make a search for the grave of the famous explorer.

AERIAL SURVEYING DURING 1929

(Continued from page 1)

one detachment only in its spare time. It is reasonable to assume that with the benefit of a season's experience in aerial work the Geodetic Survey will be able to make use of the aeroplane even more extensively in the future.

The operations this year have shown that the geodetic reconnaissance, both general and detailed, can be made by aeroplane, an area being covered in a few hours that would take weeks or months of arduous travel afoot. The stations having been selected, the tower-building party can be transported by air and landed on some lake near the station. The work completed the party is moved to the next station by plane which brings in, on its trip, fresh supplies and materials. The observing party sets out its lights by aeroplane and is moved from station to station in the same way. In addition to all this the chief of the party and the Head Office in Ottawa are thus able to keep in almost daily touch with the various widely scattered units of the organization.

During the season the aeroplane was also largely used by the Supervisory Mining Engineer and members of his

COMMEMORATE INDIAN CHIEFS IN PLACE-NAMES

Numerous Geographical Features in Canada Bear Names of Indian Leaders

Geographical features named after Indian chiefs are numerous in Canada. It is exactly 100 years since the first appearance on a map of the name Petawawa. According to the records of the Geographic Board of Canada, Petawawa river occurs on a map made in 1829 by Colonel John By, who built the Rideau canal. The name is now also applied to the military camp on the Petawawa river in Renfrew county, Ontario. The Indian chief, Petawawa, is said to have hunted in the region and the meaning of the name is "the sound is coming" or "approaching sound." In some cases an Indian has been commemorated by a name given him by the whites. There are several examples of this nature in New Brunswick, where Barnaby river, Bartibog river, Cain river and Taxis river bear the names of Indian chiefs who once lived on these streams. In Quebec the town of Donnacona recalls the "Lord of Canada," who was taken to France by Jacques Cartier in 1536 and died there. In Manitoba, Peguis post office takes its name from a Saulteaux chief, who, in 1835, was granted an annuity of £5 by the Hudson's Bay Company. He was a friend of the colonists of the Red River Settlement (Winnipeg) and well disposed towards the whites. In Saskatchewan, Cutknife hill, according to tradition, commemorates a Sareee who was killed on it in battle with Crees. In Alberta, Crowfoot village, Mekasto railway station, and Chiniki lake are a tribute to the worth of Indian chiefs who on the coming of white men ceded their title to vast acres and foresook tribal warfare. Crowfoot, head chief of the Blackfeet, was a keen business man, not a warrior, who kept his tribe at peace with the whites. Mekasto, or Red Crow, head chief of the Southern Bloods, was loyal throughout the 1885 rebellion. Chiniki was a Stoney Indian chief. Kananaskis pass in the Rockies commemorates an Indian who made a wonderful recovery from the blow of an axe. Pouce-Coupé river in Alberta and British Columbia bears the name of a Beaver Indian chief who settled on the river with 500 followers. The name is French for "cut thumb." In British Columbia, Kinbasket lake, an expansion of the Columbia river, was so named in 1866 by Walter Moberly, C.E., after a Shuswap Indian chief who was of service to him on an exploratory trip. Nicola lake commemorates an Indian chief whose other name, Nwistermeekin, meaning "walking grizzly bear," well describes his character.

staff to keep in touch with developments and prospecting throughout the Prairie Provinces and the Northwest Territories. Those engaged in mining activity in many parts of Canada are placing more and more reliance in aerial prospecting and transportation.

Canada's First Cheese Factory

The first Canadian cheese factory was established in Ontario in 1864.

PROGRESS OF FRUIT GROWING ON PRAIRIES*

Development Has Been Feature of Agricultural Advance in Western Canada

The development of fruit growing on the Canadian prairies has been one of the features of agricultural progress in recent years in that part of the Dominion. Patches of native gooseberries, currants, and raspberries have evolved into orchards containing many different varieties of plums, apples, cherries, and small fruits. This expansion has followed closely on the widespread planting of shelterbelts. Protected by these belts of trees, fruits which previously could not withstand the drying winds and low precipitation, now thrive and add to the comfort and health of prairie settlers.

Fruit growing on the prairies began with the domestication of native varieties and the development by experiment of hardy crosses. In recent years a number of varieties of currants, gooseberries, raspberries, and strawberries have been generally planted from Emerson, Manitoba in the southeast to Grande Prairie, Alberta, in the northwest. A number of persons in Manitoba now have commercial plantations of these on a considerable scale. The largest acreages are devoted to strawberries and raspberries. Considering the yields over a number of years, gooseberries are the surest producers and raspberries the next in order of dependability. Currants are almost certain, provided defoliating diseases and insects are kept in check. Strawberry plants being herbaceous and shallow-rooted are sensitive to drought conditions. With plenty of moisture in the months of May and June they produce profusely. Blueberries and cranberries, although native, are not cultivated to any great extent but native grapes are widely grown.

It required years of experimentation by Dominion Experimental Farms at Ottawa and in the prairies and by private individuals before suitable varieties had been developed and methods of handling worked out which made possible the production of tree fruits on the prairies. The native plum, chokecherry, pin cherry, sand cherry, saskatoon berry, and pembina (high bush cranberry) were the only tree fruits successfully raised by the early settlers. The past decade has seen drastic changes. Native plum seed from southern Manitoba has been taken to gardens in Saskatchewan and Alberta. Hardy varieties of Canada plum have been gathered in the Riding Mountain district of Manitoba and distributed to other parts of the Prairie Provinces while crab apples developed on Experimental Farms are the basis of orchards from northern Alberta to the pine woods of Ontario. The most recent development is in varieties of standard apples. The late A. P. Stevenson at Morden, Manitoba, was a pioneer in this work. Many others are now producing standard apples and the supplying of apple and plum trees for planting has become one of the chief lines of nursery firms in the West.

The Dominion Experimental Farm at Morden has one of the largest collections of apple varieties in Canada



Fruit-growing on the Prairies—This photograph shows a Melba apple tree, with its burden of delicious fruit, on a farm near Miami, Manitoba. The shelterbelt in the immediate background makes possible the successful growth of such fruit trees.

TO OPEN COPPERMINE RIVER MINERAL AREA

July 1, 1930 Fixed as Date for Withdrawal of Reservation

Reports having reached the Department of the Interior of the existence of rich deposits of native copper on the shores and islands of Bathurst inlet and Coronation gulf, at and near the mouth of the Coppermine river in the Northwest Territories, the area lying north of the 65th parallel of north latitude and between the 105th and 116th degrees of west longitude, reported to contain this discovery, was withdrawn from disposal under the mining regulations, by Order in Council dated December 21, 1918, to admit of a thorough examination being made of this region.

While the investigation which has since been conducted, and which, owing to the remoteness and extent of the territory, has not been as thorough as originally contemplated, has disclosed the presence of dislocated fragments of native copper and considerable deposits of comparatively low-grade ore, exploration on an extensive scale would appear to be necessary to determine whether or not these deposits are sufficiently valuable to admit of profitable operation.

The improvement which has recently taken place in facilities for transportation to and communication with that remote region, has now rendered it possible for a more detailed investigation of the entire district to be conducted through private enterprise, for which reason, authority has been obtained by Order in Council dated January 14, 1930, for the withdrawal of this reservation on July 1 next, on and after which date the area affected will again become available for disposal under the mining regulations in force in the Northwest Territories.

and this station supplies fruit seed in season free of charge to applicants. The first trees were set out in 1916, and in 1929 the harvest ran up into thousands of boxes. Varieties fruiting ranged from the Hibernial to the McIntosh Red, and prairie home-makers who visited the station during the summer of 1929 were thrilled with the sight of the orchards laden with the year's harvest.

Banff, the headquarters of Banff national park, Alberta, has an altitude of 4,533 feet above sea level and enjoys a climate which is in many respects, ideal. The air is exceedingly pure and has a most exhilarating effect.

TREE PLANTING ON PRAIRIE FARMS IN WESTERN CANADA

(Continued from page 1)

The growing of fine vegetables and small fruits, flowers, and shrubs has, as noted above, invariably followed the development of the shelterbelt. Recent reports of the inspectors show that of about 7,600 farms thus protected, 6,800 had good vegetable gardens; 2,700 carried small fruits such as strawberries, raspberries, and currants; and about 400 had orchards of hardy strains of apples, plums, and cherries.

To insure the proper preparation of the soil and to aid applicants in laying out their shelterbelts, the Forest Service of the Department of the Interior maintains a staff of specially trained inspectors who visit the farms of applicants and assist in planning the plantation. Properly worked, deep summer-fallow is the only soil preparation that can be relied upon to give uniformly good results in all seasons, which is the reason that this preparation is required on the part of all prospective planters. To allow ample time for inspection to be made, it is essential that applications for trees be received at the Forest Nursery Station at Indian Head, Saskatchewan, not later than March 1, one year prior to the spring in which the planting is to be done.

HOW BEVERLY LAKE GOT ITS NAME

Beverly lake is the most westerly of the chain of lakes through which the waters of the Thelon river flow into Chesterfield inlet and Hudson bay. It was so named by Mr. J. W. Tyrrell, C.E., after Beverly Fairchild, the young son of Mr. C. C. Fairchild, D.L.S., the chief assistant of Mr. Tyrrell in the exploratory trip through that part of Canada in 1900 for the Department of the Interior.

Early Forest Fire Patrols

The Forest Service of the Department of the Interior has found that, by the use of aircraft equipped for winter flying, it is now possible to commence the patrol of forest areas in Manitoba and Saskatchewan in March instead of late May, as formerly. In this way fires started by trappers, prospectors, and others, during the winter months, are detected and reported, and means taken for their suppression before they attain serious proportions.

ESTABLISH NATIONAL PARK IN MANITOBA

Preserve Riding Mountain Forest Reserve as Scenic and Recreational Area

In pursuance of the policy of setting aside areas of outstanding scenic beauty and recreational value for the perpetual use of the people, Hon. Charles Stewart, Minister of the Interior, has secured the passage of an Order in Council establishing the Riding Mountain forest reserve in Manitoba as a national park.

The new playground, which will be known as the Riding Mountain park, comprises 1,148 square miles of rolling woodland in the western part of the province. Clear Lake, situated on the shore of the beautiful body of water of the same name at the southern end of the mountain, will be the headquarters of the new park. Clear Lake is already a popular resort and there are approximately 100 cottages built by summer residents along the shores. The region is mostly rolling woodland, with fine stands of jack pine, spruce, birch, and poplar, rising into the range known as the Riding mountain. On the summit of this mountain ridge lies a broad plateau which has an elevation of approximately 2,000 feet above sea level. The region is noted for its scenic beauty, and numerous lakes, with fine beaches, and streams afford splendid facilities for fishing, boating, and camping. The area is a natural home for big game and already contains, it is estimated, over 2,000 elk and 500 moose, together with many other wild animals. Last year the Forestry Branch of the Department of the Interior began work on the construction of an up-to-date golf links in the vicinity of Clear Lake, and it is expected that this work will be carried on and completed in the immediate future by the National Parks authorities.

The new park is centrally located within convenient reach of all parts of the province and of railways and main motor highways. It adds one more to Canada's growing list of attractions to tourists from other provinces and other countries and provides as well a delightful playground for residents of this section of the Great West.

BANFF FAMOUS AS SCENIC AND HEALTH RESORT

Hot Sulphur Springs in Banff National Park a Mecca For Thousands

If Banff national park in the province of Alberta had not become famous for its beauty, it must have become so for its hot springs, but the two combined, together with the clear, bracing air, make it one of the finest health resorts in North America. Near the town of Banff there are five chief springs, the warmest of which is known as the Upper spring. This is two and a quarter miles from the town and is reached by a road which winds up Sulphur mountain through lines of lodgepole and jackpine. In early days a rude sanitarium was erected at the springs, and one of the interesting sights on the adjacent hillside was a collection of testimonials left by grateful sufferers as to the curative properties of the water of the spring. Sometimes these were a discarded cane or crutch, sometimes a rough board bearing a record of the patient's healing. Unfortunately this early sanitarium was burned down several years ago and with it were destroyed these testimonials.

*Prepared at the direction of Dr. J. H. Grisdale, Deputy Minister of Agriculture, by Mr. W. R. Leslie, Superintendent, Experimental Station, Morden, Manitoba.

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CANADA'S REINDEER WELL ADVANCED ON EASTWARD JOURNEY

WILL REACH MACKENZIE DELTA IN 1931

Interior Department Official Returns from Alaska—Selected Animals and Saw Drive Started

The drive of 3,000 reindeer from the west coast of Alaska eastward to the delta of the Mackenzie river in the Northwest Territories of Canada is progressing favourably and early in March the herd is expected to reach the basin of the Colville river in northern Alaska, where it will remain during the coming summer, resuming the movement in October. Word of the progress of the reindeer purchased by the Dominion Government was brought by Mr. A. E. Porsild of the North West Territories and Yukon Branch, of the Department of the Interior, who recently returned from Alaska. While in the North Mr. Porsild selected the animals to be included in the movement and saw the drive well under way before he returned to Ottawa.

The establishment of reindeer herds in Northern Canada is to provide a new source of food and clothing for the native inhabitants. The introduction of high-powered firearms among the natives and the keen competition for furs has tended to seriously deplete the numbers of fur-bearing and other game animals in the Far North, and the provision of supplementary supplies such as reindeer can furnish is deemed desirable. Surveys completed by Mr. A. E. Porsild and his brother, Mr. R. T. Porsild, in the area east of the Mackenzie delta and around Great Bear lake in 1927-28 have shown that large parts of the great northern plains and adjoining tracts of open timbered land between the Coppermine and Mackenzie rivers are eminently suited to reindeer grazing, and will support vast herds of these animals. It is proposed to establish the 3,000 animals recently purchased in the area immediately east of the delta of the Mackenzie and as they increase to place smaller herds at other suitable points. The natives will be instructed in the handling and herding of the reindeer.

Mr. A. E. Porsild left Ottawa late in August for Alaska to supervise the selection of the Canadian herd. He arrived at Nome and later proceeded to Elephant point, Kotzebue sound, where a large new reindeer camp has been established. Here he met the Alaska manager of the firm from which the reindeer were purchased and the herders who are now in charge of the drive.

(Continued on page 4)

EXTENDS NATIONAL PARKS SYSTEM

Canada Establishes Scenic and Recreational Areas in Manitoba and Ontario—Popularity of Parks

Canada's fine system of national parks has recently been augmented by two interesting additions: the Riding Mountain national park in Manitoba and the Georgian Bay Islands park among the so-called Thirty Thousand Islands of Georgian bay. The Manitoba park originally formed part of the Riding Mountain forest reserve. It covers over 1,100 square miles of rolling wood-

land country dotted with several beautiful lakes and rising to the well known Riding mountain. It is a natural home for big game and its reservation as a park will not only conserve a typical example of the scenery of Manitoba but will make provision for the recreational needs of the people of this part of Canada and become an important big game sanctuary and tourist attraction as well.



Extending Canada's National Parks—Looking across a small lake at the northeast end of Beausoleil island, the largest island in the group comprising the Georgian Bay Islands park in Ontario. For many years the Georgian Bay region of Ontario has been steadily gaining in popularity as a tourist and summer resort region and the setting aside of areas for the use of the general public shows timely forethought. The new national park is readily accessible by rail, motor car, and steamboat and splendid accommodation for visitors may be secured in any of the nearby towns and summer resorts.

The Georgian Bay Islands park consists of twenty-nine island reservations in one of the most beautiful regions of Canada, which in recent years has become the home of large numbers of summer residents, many of them from across the international boundary. Owing to the popularity of this region the islands have been rapidly passing into private hands and it was clear that unless provision was immediately made no access would soon be possible to the general public for camping, and picnicking. Beausoleil island was in fact the last large island which had not yet been taken up. This island in itself is extensive enough to become a considerable resort. It covers nearly five square miles and possesses fine bathing beaches, beautiful groves of trees and a varied bird and plant life. Its historical traditions and remains will also add to its interest.

land country dotted with several beautiful lakes and rising to the well known Riding mountain. It is a natural home for big game and its reservation as a park will not only conserve a typical example of the scenery of Manitoba but will make provision for the recreational needs of the people of this part of Canada and become an important big game sanctuary and tourist attraction as well.

Minister of the Interior, in a recent public address stated that it was his desire to see a national park established in every province of the Dominion, so that the benefits to be obtained from these great playgrounds and reserves should be made available to citizens in every part of Canada.

While the immaterial benefits are many and must increase as time goes on, there are also material ones which are readily obvious. The way in which a national park may contribute to general prosperity through the stimulation to tourist travel is well shown in the case of the Prince Albert park in Saskatchewan. Although established less than two years and situated seventy miles from the nearest railway it drew in 1929 10,000 visitors, while Point Pelee park, a small reservation in southern Ontario, which draws a large percentage of United States visitors, increased its registrations from 50,000 to 100,000 in one year.

A recent analysis of the inducements which bring visitors to Canada from across the line showed that the strongest attraction was new and striking scenery. "Beauty, spiced by wonder," said Mr. Stephen Mather, former Director of the United States Park Service, "is the greatest lure to travel," and this is the

(Continued on page 5)

CANADIAN TREE SEED IN EMPIRE REFORESTATION

ANNUAL SHIPMENTS TO GREAT BRITAIN

Department of the Interior Operates Several Seed Extraction Plants in Western Canada

Canada is yearly playing a bigger part in Empire reforestation as shown by the shipments of tree seeds from the seed extraction plants of the Forest Service of the Department of the Interior. How large these shipments bulk in tree planting work in the British Isles may be gauged from the recent report that the British Forestry Commission has in the past ten years planted 140,000 acres of softwoods and that its program includes the planting of 23,000 acres annually. Much of the seed used in this work comes from Canada. The climate of Great Britain is, on the whole, similar to that of the coast of British Columbia, and it is the species native to that region that are largely being planted.

At the request of the Forestry Commission the Government of Canada undertook to collect each year the seed required, and to this end the Forest Service of the Department of the Interior erected a large and modern seed extracting and cleaning station at New Westminster, British Columbia. This was in addition to three smaller plants in the Prairie Provinces which supply seed for local planting.

From a small beginning in 1917, the seed collecting and distributing work of the Dominion Forest Service has grown to large proportions, until to-day, this activity is assisting in building up forests in many parts of the British Empire. Great Britain and New Zealand in particular, use large quantities of Canadian tree seed. Australia does so to a smaller extent. To date approximately seventeen tons of cleaned seed have been supplied. Of this 53 per cent has gone to Great Britain and 40 per cent to New Zealand, while the remainder has served to meet the needs of Australia, Ireland, and other parts of the Empire.

Sitka spruce from the Queen Charlotte island on the British Columbia coast has formed 33 per cent of the seed collected. Most of this has gone to Great Britain. Western yellow pine, collected in the interior regions of that province forms another 33 per cent. This is largely helping to reforest New Zealand. Douglas fir from the Coast regions, represents about 20 per cent of the seed shipped (mostly to Great Britain) and the rest is composed of smaller quantities of Western red cedar, lodgepole pine, Western hemlock,

(Continued on page 5)

CANADA POSSESSES MANY TYPES OF CLAY*

Department of Mines Aids in Greater Utilization of These Important Resources

Canada is fortunate in possessing resources in many types of clay employed in the manufacturing industries. In a list of thirty-five lines of manufacture in the Dominion, clay of one type or another appears among the supplies for twenty-four of them. It is used in large amounts in the making of such materials as cement, paper, and textiles. It is even used as a purifier of lard and oils. Its greatest use, however, is in the so-called clay-working industries in which over a million and a half tons of various types of clay enter into the composition of the products each year. These industries represent an invested capital of over thirty million dollars and employ almost five thousand men.

These types of clay differ greatly in physical properties such as colour in the natural and burned state, plasticity, strength when dry and burned, shrinkage, vitrification range and refractoriness. The clays used in the clay-working industries are classified according to the purposes for which they are adapted. For example, there are pottery clays, including china clay or kaolin and ball clay used in the compounding of porcelain; stoneware clay for making vitrified ware, and earthenware clay for making the more porous earthenware; refractory clays capable of withstanding very high temperatures used for the manufacture of firebrick; sewer pipe clays which produce a dense impervious body capable of taking a salt glaze for the making of sewer pipes and similar products; and brick and tile clays and shales for the manufacture of structural brick and tile and farm drain tile.

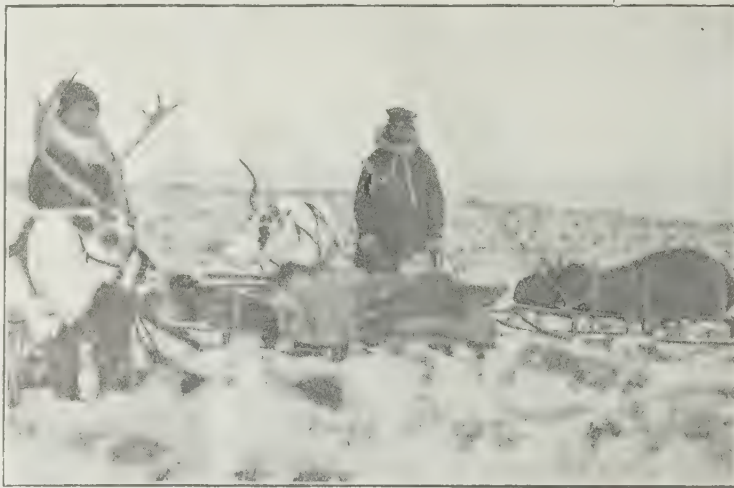
The pottery clays cannot be said to be plentiful so far as distribution is concerned but there are a number of deposits of importance, particularly of china clay in Quebec and British Columbia; of ball clay in Saskatchewan; and of stoneware and earthenware clays in Nova Scotia, Saskatchewan and Alberta.

Fireclays are graded according to their refractoriness or the temperature which they can withstand in service, ranging from low heat duty to medium, and high heat duty. The high heat duty or high grade fireclays are of rather rare occurrence in Canada but the lower grades are of broader distribution. With the exception of Prince Edward Island and Manitoba all the provinces of Canada are known to possess deposits of fireclay though some of the deposits are too remote from the markets to be of immediate value.

Sewer pipe clays occur in Nova Scotia, New Brunswick, Ontario, Saskatchewan, Alberta, and British Columbia.

In the manufacture of building brick and structural and drain tile, common surface clays and shales are used and, to a lesser extent, low grade fireclays. Canada has immense resources of such clays and shales suitable for making good quality building brick of a wide range of texture and colour, distributed through the nine provinces, and there is ample evidence that good use

*Prepared at the direction of Dr. Charles Cammell, Deputy Minister of Mines, Canada, by Mr. Howells Frechette, Chief, Division of Ceramics and Road Materials, Mines Branch.



Canada's Reindeer Herd—Two of the herders who are accompanying the herd of 3,000 reindeer, recently purchased by the Dominion Government, on the long drive across Alaska to the grazing grounds east of the delta of the Mackenzie river in Northern Canada. Their sleds and sled deer are also seen in this picture.

POLAR BEAR ATTACKS ARCTIC POLICE PATROL

Hunger-crazed Animal Attempts to Force Way Into Igloo of R. C. M. P. Party

During the 1,800-mile journey of Inspector Joy and Constable Taggart of the Royal Canadian Mounted Police in the spring of 1929 in the Canadian Arctic archipelago, they had an encounter with an angry polar bear which, while it ended happily, shows how alert and resourceful Canada's representatives in the North must be to prevent commonplace daily incidents resulting in tragedy.

Asleep in their igloo (snow-hut), Inspector Joy and his two companions—Constable Taggart and an Eskimo driver—were aroused by the barking

of the tethered dogs announcing the very ordinary occurrence of the visit of a bear. There was no intention to interfere with the animal, but it soon became apparent that something would have to be done because the brute could be heard tearing the party's clothing and provisions from one of the komatiks (sleds). The Inspector unwillingly gave the order to shoot the bear, but when Constable Taggart attempted to get outside he found the doorway of the igloo buried in a drift of hard snow. The three occupants thereupon raised a terrific noise to frighten the bear away, but instead the bear turned swiftly to the igloo, climbed all over it, and, by the time a hole was made in the ice-lined wall large enough for a man to crawl through, was waiting outside and immediately made a savage plunge to get inside. The police were at a disadvantage because it is the necessary custom of the polar regions to stack firearms outside the snow-huts for the reason that, if kept inside, the warm "sweaty" rifle would instantly freeze on sudden exposure to the open air and thereby be rendered useless.

In this case the gun in its cover was standing close by the hole made in the wall, and, just as the desperate attack of the bear was beaten back for the moment, Constable Taggart seized the rifle. In a flash, however, the bear struck the rifle from Taggart's grasp, and then, as if to frustrate any further attempt to recover it, stood on it with both forepaws, snarling angrily, with his head thrust through the hole. A second later the bear made another desperate lunge to get at the men but was met with such a vigorous counter attack with sticks and snow knife that he was driven back a pace or two. At that moment Taggart recovered the rifle and dropped the bear in the midst of its third wild charge. It was a large animal and was, no doubt, particularly savage through hunger.

Contrary to popular opinion, Canadian police and explorers do not regard the polar bear as the "great white terror of the north" nor do they avoid the localities where bears most abound. As a matter of fact they are glad to discover bears along a projected route because bears congregate where seals are plentiful and their presence assures travellers of a bountiful food supply both for their dogs and themselves. The police and other Government officials in the north always conserve wild-life and kill bears only when absolutely necessary for food. At times, however, as the above story indicates, drastic action has to be taken.

FOUR NEW PAMPHLETS ON N.W. TERRITORIES

Interesting Reports on Canada's Vast Northland by Interior Department Officers

Great interest is now centred in the Northwest Territories of Canada and the Minister of the Interior, Hon. Charles Stewart, because of the increasing importance of that part of the Dominion had investigations and surveys made of the different aspects of Territorial life, and arranged that concise and accurate reports on conditions there be issued as speedily as possible. Below are listed four bulletins, some of which are already printed and some just about to issue from the press, which give a great deal of information about our Northland as it is to-day. The value of each of the bulletins is increased by a number of carefully selected illustrations, from pictures mostly taken within the last few months. Each has also one or more sketch maps. Copies of any of these bulletins may be had free upon application to the Director, North West Territories and Yukon Branch, Department of the Interior, Ottawa.

The North West Territories 1930, by F. H. Kitto, F.R.G.S., of the Department of the Interior. This is a compendium of our most recent information on the extent, topography, population, resources, climate, transportation facilities, and governmental organization of the Territories. The resources dealt with include the fur bearers, agricultural and grazing lands, forests, water-powers, minerals (including oil), fish, game, the bison, the musk-ox, the caribou, and the possibilities for reindeer.

Aerial Mineral Explorations of Northern Canada, by G. H. Blanchet, B.Sc., D.L.S., F.R.G.S., of the Department of the Interior. Mr. Blanchet was attached as an observer to one of the companies conducting aerial explorations inland from Hudson bay north of latitude 61 and in part of the Arctic coastal plain, including Bathurst Inlet area and extending to Great Slave lake. He describes aerial prospecting, aerial routes, character of equipment, and what has been accomplished by this new method of observation and transportation. Having for many years explored Northern Canada by ground methods he is able to explain the advantages and limitations of aerial exploration.

Coronation Gulf Copper Deposits, by L. T. Burwash, M.E., F.R.G.S. Major Burwash who has spent many years in exploratory work in Northern Canada for the Department of the Interior, made in the years 1928-29 an investigation into Eskimo living conditions, wild life, transportation possibilities, and observations relative to the magnetic pole. He spent the winter at Gjoa Harbour, on King William island and in the spring of 1929 was directed by wireless from Ottawa to examine the Coronation Gulf copper deposits. This bulletin is a record of the results of this examination and contains also sections relating to methods of travel, transportation routes, and equipment, clothing and food necessary for expeditions going to the North.

Reindeer Grazing in Northwest Canada, by A. E. Porsild. The rapid change now going on in living conditions among the Indians and Eskimos in Northern Canada caused the Minister of the Interior in 1926 to institute an investigation into the possibility of introducing domestic reindeer to supplement the natives' supply of food and clothing. Mr. Porsild was directed to make an investigation of grazing grounds in Northern Canada and also the possibility of driving a herd of reindeer from Alaska. Mr. Porsild spent thirty months in this work travelling by dog-sled and canoe and his report is embodied in this bulletin.

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OTTAWA, MARCH, 1930

EXTENDS NATIONAL PARKS SYSTEM

(Continued from page 1)

outstanding appeal made by the national parks. But while the parks are an increasing lure to foreign travel they are also becoming more and more the playgrounds of Canadians themselves. In the parks in the Rockies an increasing percentage of visitors is drawn from the Prairie Provinces, British Columbia, and Eastern Canada.

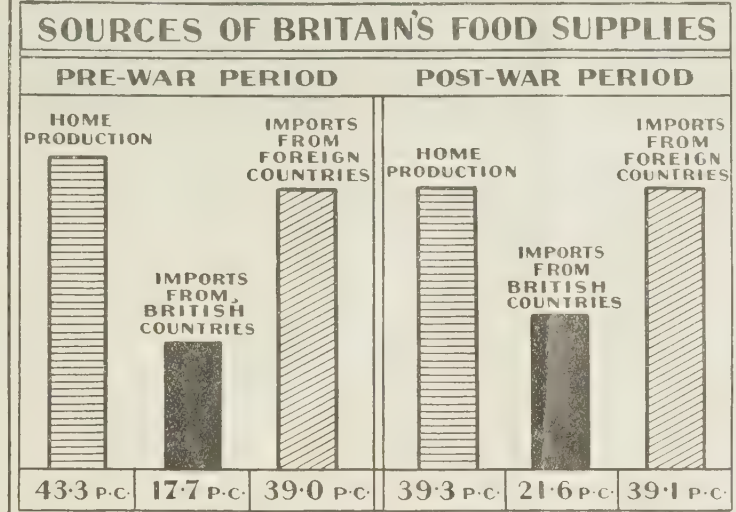
The sums spent by the people of the United States in travel are astonishing. Figures published by the United States Department of Commerce show that in 1928 the total expenditure of U.S. citizens on travel outside their own boundaries was approximately \$818,606,000. Of this sum \$650,000,000 was spent outside of North America. In 1929 the total expenditure is estimated to have reached the colossal sum of one billion dollars. This, it is stated, represents about one per cent of the total annual income of the country. In recent years Canada has been receiving a rapidly increasing share of this traffic. Figures published by the Dominion Bureau of Statistics placed the tourist revenue of the country in 1928 at over \$250,000,000. The figure for 1929 has been placed by a preliminary estimate at \$300,000,000. The total value of Canada's mineral production for 1929 is estimated at \$303,876,000 which indicates how rapidly tourist travel is climbing into one of the first places among our sources of national wealth.

As Hon. Mr. Stewart pointed out, valuable as the parks are already recognized to be, they are likely to be appreciated more and more as time goes on and the wild places of the country are taken up. Already public men in the United States are deploring the almost complete disappearance of unspoiled scenic conditions there. Canada realizes that while she is to-day numerically a small people, the day will inevitably come, much sooner perhaps than is realized, when she will be much more developed, and supporting a large population. The rapidity with which such changes can be brought about has been greatly accelerated in recent years. To-day thanks to the use of the aeroplane, Canada's immense northern areas are being so swiftly opened up that it is hard to realize what is going on. Each year the northern boundary is pushed farther back and regions which, in the ordinary course of events must have waited many years for development, have been brought within the touch of civilization. What the next fifty years have in

SOURCES OF BRITAIN'S FOOD SUPPLIES

The furnishing of food supplies to the British Isles forms, in the aggregate, perhaps the greatest single factor in international trade—a factor which has played an inestimably powerful role in developing the resources not only of Canada but of Australia, Argentine, United States, Denmark, New Zealand, and literally scores of other food-ex-

British Ministry of Agriculture. The figures quoted by the *Statist* form the basis of the accompanying diagram. Contrasting the period 1905-09 with the period 1924-27, they bring out the fact that there has been a marked decline in the percentage of Britain's food requirements that is met by home production—a decline from 43.3 per



porting countries all over the globe. The volume of this commerce is indicated by the fact that Britain annually consumes over \$3,000,000,000 worth of food products, of which three-fifths are imported.

A recent issue of the London *Statist* quotes some highly significant figures taken from a report, published by the

cent in the pre-war period to 39.3 per cent in the post-war period. During the interval there has been little or no relative increase in the food imports from foreign countries, but there has been a pronounced gain in the extent to which Britain's food supplies are being met by imports from Empire countries.

COMPARATIVE FIGURES OF WESTERN LAND SETTLEMENT

Homestead Entries and Soldier Grants For January, 1930, And Same Period Last Year

Comparative figures compiled in the Dominion Lands Administration of the Department of the Interior show the number of homestead entries and soldier grants made in the periods January, 1930, and January, 1929. The figures follow:—

Agency	Home- steads 1929	Home- steads 1930	Soldier Grants 1929	Soldier Grants 1930
Calgary..	30	21	4	2
Dauphin..	23	20	..	..
Edmonton..	208	179	7	12
Grande Prairie..	78	101	4	13
Kamloops..	1	2	..	..
Lethbridge..	12	8	..	..
Moose Jaw..	101	47	4	..
New Westminster..	..	5	1	2
Peace River..	80	109	5	8
Prince Albert..	208	158	5	15
Revelstoke..	..	4	..	..
Winnipeg..	19	9	1	..
Totals..	761	663	31	52

store for Canada it is impossible to foretell, but that there will be a great expansion, is generally acknowledged. It is fortunate, therefore, under these conditions that by forethought Canada is preserving regions of outstanding natural beauty as represented by the growing system of national parks.

Wide Range of Clays

As might be expected in a country as large as Canada, and in which so many geological formations are represented, a wide range of clays and shales suitable for various uses are found.

COMPLETE FIGURES OF ALBERTA'S OIL OUTPUT

Last Year's Production Reached 999,152
Barrels—Turner Valley Principal
Producer

Complete figures of oil production in Alberta during the month of December, 1929, and for the calendar year have been compiled in the Department of the Interior from the reports of the operators. The record shows the tremendous increase in production during 1929 as compared with the previous year, last year's total reaching 999,152 barrels which is very close to the estimated 1,000,000 barrels. The 1929 production was more than double that of 1928 which yielded 489,152 barrels.

The analysis by fields shows that Turner Valley is by far the greatest producer, the total for that field being 981,221 barrels, of which 908,741 barrels was naphtha and the remainder light crude.

The comparative figures for December, 1929, and the corresponding period last year; the annual production during the past five years; and production by fields in 1929 follow:—

	Naphtha 60° or over (brls.)	Light 30° to 30° or 60° under (brls.)	Heavy Crude (brls.)	Total (brls.)
December, 1929...	82,915	8,599	2,840	94,354
December, 1928...	44,800	5,301	1,295	51,396
Annual Production 1925-1929				
1929 Total...	908,741	73,808	16,603	999,152
1928 Total...	410,623	70,734	8,174	489,531
1927 Total...	290,270	38,808	3,055	332,133
1926 Total...	211,008	2,609	5,981	219,598
1925 Total...	165,717	2,926	..	168,643
1929 Production by Fields				
Turner Valley ..	908,741	72,480	..	981,221
Red Coulee ..	..	1,328	..	1,328
Skiff ..	..	1,432	..	1,432
Wainwright ..	..	12,332	..	12,332
Ribstone ..	..	2,339	..	2,339

CANADIAN TREE SEED IN EMPIRE REFORESTATION

(Continued from page 1)

Western white pine, and a number of other species.

The crop of tree seed varies greatly from year to year. The coast variety of the Douglas fir which is in greatest demand, has not borne abundantly for some years, and the crop was again a failure during the past season, 1929. In the interior of the province, this tree bore abundantly, but the Douglas fir from this region is not favoured for overseas planting, since it is reported to be of somewhat slower growth than the same species of coastal origin. Western yellow pine is more regular in crop production, and this year the Forest Service found it possible to collect 7,000 pounds for New Zealand. Sitka spruce is also a fairly regular seeder and this season, having a medium crop, it was possible to secure the 1,500 pounds required annually by the British Forestry Commission.

MAJOR HYDRO-POWER SYSTEMS OF CANADA

Eighteen Have Annual Output of 100,000,000
Kilowatt-Hours or More

The "large" hydro-electric power systems of Canada are, in accordance with recognized practice, defined as those with an annual output of 100,000,000 kilowatt-hours or more. In 1928 Canada had 18 such systems distributed from coast to coast. The Hydro-Electric Power Commission of Ontario had an output exceeding four billion kilowatt-hours and in Quebec four systems considerably exceeded a billion kilowatt-hours each. These 18 large systems accounted for 92 per cent of the total units generated in all central electric power systems in Canada.

The principal hydro-electric power systems of Canada in 1928 stood thus in order of the magnitude of their output:—

1. Hydro-Electric Power Commission of Ontario.
2. Shawinigan Water and Power Company.
3. Duke-Price Power Company (Saguenay river).
4. Montreal Light, Heat and Power Cons.
5. Gatineau Power Company.
6. Laurentide Power Company.
7. Winnipeg Electric Company.
8. Canadian Niagara Power Company.
9. West Kootenay Power and Light Company.

10. British Columbia Power Corporation.
11. City of Winnipeg Hydro-Electric System.
12. Canada Northern Power Corporation.
13. Abitibi Electric Development Company.
14. Dominion Power and Transmission Company.
15. Ottawa and Hull Power and Manufacturing Company.
16. Southern Canada Power Company.
17. Great Lakes Power Company.
18. Calgary Power Company.

WARDEN COMPLETES AN ARDUOUS JOURNEY

Westward Trip From Baker Lake to Reliance
Included Patrol of Thelon Game
Sanctuary

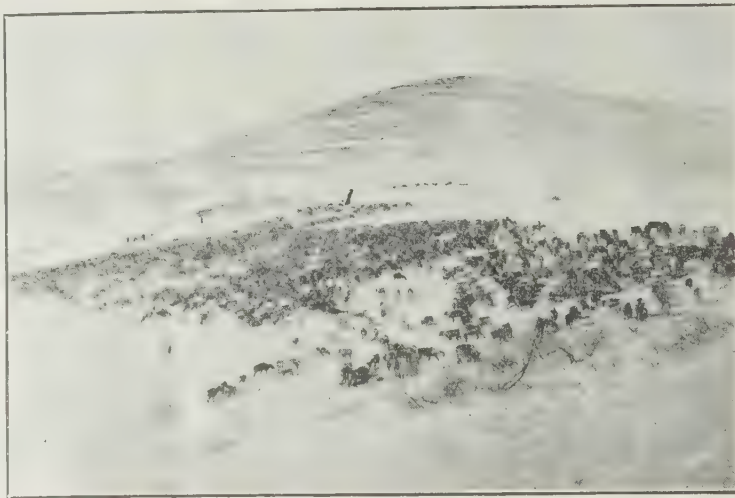
Warden A. J. Knox, of the North West Territories and Yukon Branch of the Department of the Interior, has completed the return journey from Baker Lake, at the head of Chesterfield inlet, Hudson bay, to Reliance at the east end of Great Slave lake. During this trip he patrolled through the Thelon Game Sanctuary. Warden Knox accompanied Mr. W. H. B. Hoare, special investigator of the North West Territories and Yukon Branch, during his seventeen months' examination and patrol of the northern musk-ox preserve which was concluded in August last year. Mr. Hoare came to Baker Lake on his way to Chesterfield to meet the Canadian Arctic patrol ship *Beothic* on its homeward voyage. Warden Knox picked up supplies at Baker Lake and in company with an Eskimo boy began the return trip to the sanctuary.

In his westward journey, Warden Knox had to face high winds, blizzards, bitter cold, and many other hardships. At one time when through accident he was without a compass he became lost but regained the trail and reached his objective. He left Baker Lake early in September, and after a stiff battle with high winds, the Thelon river was reached on the 19th. With "freeze-up" expected anytime, Warden Knox and his Eskimo assistant busied themselves netting fish for dog feed and otherwise preparing for the cold weather.

The work of building a sled for the continuation of the journey was undertaken. Although the lakes were frozen over on October 6 it was a month later before the ice was thick enough for travel. On November 27 after a very arduous journey Warden Knox arrived at the cabin at the junction of the Thelon and Hanbury rivers. Here, one of the dogs which strayed away from the team during the eastward journey in the summer, was found in good condition. On July 21 he had raced away in pursuit of a herd of caribou and was not seen again. It was expected that he would return to the cabin and a supply of food had been left there for him. He was added to the team for the remainder of the trip.

On December 4 the journey to Reliance was continued but as Warden Knox was without a compass, due to an accident earlier in the trip, he lost his way. The trip across the northern plains he described as cold, with high winds, mist, and a heavy ground drift every day. He discovered that he had missed the trail when he came to a lake near timberline. However the sight of the spruce trees was a welcome one as it gave him and his assistant an opportunity to dry out their clothing and sleeping bags which were frozen stiff. Judging that he had gone too far south of Campbell lake, he set his course due west. He later picked up an Indian trail, reached an encampment, and from the natives received directions which brought him safely to Reliance on December 26.

As his toboggan was worn out he secured another from the Royal Canadian Mounted Police at Reliance and continued on to Snowdrift, a Hudson's Bay Company's post at the mouth of



Canada's Reindeer Herd—The above photograph shows a herd of reindeer on winter range near Kotzebue, western Alaska. It was from herds like this that the 3,000 animals purchased by the Canadian Government were selected.

CANADA'S REINDEER ON EASTWARD JOURNEY

(Continued from page 1)

With them he discussed the route to be followed and the time schedule. The drive is to be carried out as expeditiously as possible. A reconnaissance flight by aeroplane early in October over the proposed route had to be abandoned at the divide owing to snowstorms.

The round up of reindeer took place to the southeast of Elephant point in the valley of the Napaktolik river where winter corrals are situated. Snowstorms greatly retarded the work of gathering the herds together and at one time when about 10,000 deer were being herded towards the corral a blizzard scattered them and it required eight days of hard work before the reindeer were safely within the corrals. On December 12 the work of selecting the animals for Canada was begun and 2,890 does and 307 bucks were chosen by December 16. The surplus animals over the 3,000 contracted for are to replace any lost by injury during the movement.

As the animals were chosen they were placed in charge of Eskimo herders and directed along the route to be followed. Being allowed to graze as they moved along. Mr. Andrew Bahr, three other veteran Lapp herders, and six Eskimo herders are in charge of the drive. Fifty sleds drawn by reindeer contain the equipment while about 300 reindeer steers are also accompanying the herd to assist in transportation work and as a source of supply of fresh meat.

The big herd moved eastward to the headwaters of the Napaktolik river and Mr. Porsild paints a graphic picture of the view of the approaching herd he obtained from the top of February mountain. The herd turned northeastward from this point and the crossing of the Endicott range is expected to be completed early in March. The herd will remain in the basin of the Colville river during the fawning season which occurs in April and for the greater part of the summer, moving to the coast when the flies become too bothersome. Thus the fawns will be given an opportunity to attain a size at which they can begin the journey to the east. In October next the drive will be resumed along the northern Alaska coast and it is expected that the herd will reach the east bank of the Mackenzie early

the Snowdrift river on Great Slave lake. Here he despatched his letters and reports by dog team to Resolution from which point they were carried by air mail to Edmonton and by rail to Ottawa.

in 1931, well in advance of the fawning period.

Early this spring Mr. R. T. Porsild of the North West Territories and Yukon Branch will go north by aeroplane to complete arrangements for the reception of the herd in the beginning of 1931. Materials for the erection of the corrals, huts, and other structures have already been shipped north.

EFFECT OF WEATHER ON SURVEY INSTRUMENTS

Surveyor Must Allow for Expansion and
Contraction in Basic or Control
Measurements

In surveying Canada, particularly when carrying on basic or control measurements, great care must be taken to offset the effect of changes in temperature in respect to expansion and contraction of the instruments used. In connection with the temperature of the measuring tape itself, 62° Fahrenheit is taken as the standard in Canada. This is the same temperature at which the fundamental yard measure at Ottawa is standard.

The aim in basic or control measurements is to secure results that will come well within the limits of accuracy set. To this end, the surveyor may have the actual accuracy with which the manufacturer has placed the graduation marks on his tape checked at such institutions as the Physical Testing Laboratory of the Topographical Survey, Department of the Interior. The surveyor is called upon to exercise great care in all operations and various corrections have to be applied to overcome slight errors due to whatever departure from the standard or ideal is necessary under the actual working conditions. In making these corrections such things must be taken into account as the slope at which the tape is held, the points where the tape is suspended, the pull exerted in stretching the tape, the elevation of the ground above sea level, and the temperature of the tape itself.

With regard to correction due to temperature, some tape manufacturers get around this in a graphical way by graduating the ends of their tapes to give at once the changes in length for different degrees of temperature. These graduations indicate in a striking way the differences in the length of the tape for the range of temperatures covered. From a temperature of 120° above to 20° below zero Fahrenheit the variation

MOVE MONUMENT AT SUMMIT OF ROCKIES

Is Familiar to Travellers Across Great
Divide—New Surveys Necessitate
Re-location

The monument at the summit of the Kicking Horse pass, marking the Great Divide of the Rockies, familiar to all travellers by the main line of the Canadian Pacific railway, has recently been taken down by the company and re-erected upon a new site several feet farther west. From early surveys it was believed that the previous site marked the actual height of land but during the detailed resurvey of the boundary between Alberta and British Columbia, carried out by the Inter-provincial Boundary Commission, more accurate data were obtained which necessitated a number of changes in the delimitation of the watershed. Among these was the summit of the Kicking Horse pass.

The spot is of great interest to trans-continental travellers and for many years the C.P.R. has arranged that all through trains should stop here for a few minutes to allow passengers to alight and take photographs. The new Kicking Horse highway from Lake Louise to Field which links the Banff and Yoho national parks also passes within a short distance of this point although at a higher level and the observation point on the highway, looking across to the Great Divide and down the Bow valley to the east, gives one of the finest views along the eastern section of this road.

The National Parks Branch of the Department of the Interior proposes to lay out a small landscape development adjacent to both highway and monument and to restore the natural character of the tiny stream which here divides, one branch taking its way to the waters of the Pacific ocean and the other to the Atlantic.

in the length of a 300-foot flat band steel tape, the kind used in survey operations, is over three inches.

In making measurements of control lines, however, extreme temperatures are avoided, if possible, as well as weather conditions that may result in sudden or rapid variations in the tape length. Measurements made at night or in cloudy weather are considered more reliable than those taken during the day when the sun is shining. It may not always be practical to carry on the work under such conditions and the problem which is constantly before the surveyor is to do the best he can under the conditions imposed upon him.

Considerations such as these, and others of a similar nature that relate to the work of the surveyor, constantly serve to remind him that there is no such thing possible in human experience as absolute accuracy. Accuracy is never absolute but is relative only and the best that the surveyor can do is to express the degree of accuracy in some such expression as "within an allowable error of one in a thousand, or one in ten thousand, or one in a million, etc.," as the case may be.

Yoho national park in British Columbia, on the west slope of the Rockies, is rich in beautiful scenery. The Takakkaw falls in the Yoho valley are among the most outstanding point of interest. This exquisite waterfall has the distinction of being the highest in Canada.

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CANADA'S FOREST FIRE LOSSES WERE HEAVY LAST YEAR

SITUATION WAS MOST SEVERE IN 1929

Generally Low Precipitation Aggravated Conditions—Heavy Expenditure For Suppression Work

The forest fire situation in Canada during 1929 was one of the most severe ever experienced and might easily have been the most disastrous in our history but for the development of fire fighting methods which has taken place in more recent years throughout the federal and provincial forest services and other agencies interested in forest fire protection.

The portion of the Dominion chiefly affected during the past season consisted of an area extending from western Ontario to the Pacific coast. This area experienced very little snowfall during the winters of 1927-28 and 1928-29. During the spring and summer of last year there was almost a complete lack of rain, and this condition combined with extended periods of high winds served to create an unparalleled condition of extreme drought throughout Western Canada. In the eastern portion of Canada, including eastern Ontario, Quebec, New Brunswick and Nova Scotia, dry periods were prevalent but were punctuated by occasional and timely rains.

The outstanding feature of the 1929 fire season was the extraordinary expenditure for suppression action alone, the cost of which was \$978,000. This does not represent the total cost of protection, but merely the cost of actual fire fighting. In this respect it is the highest figure on record for any one season in the Dominion.

The greater part of this expenditure was incurred in Western Canada. The lack of precipitation previously mentioned caused a recession of water levels in lakes, rivers, streams and muskegs, and this effect combined with the high winds which prevailed for long periods, made control measures exceedingly difficult, since fires starting, spread rapidly over large areas. Under such conditions large crews were necessary for weeks and in many cases months, to finally extinguish fires.

During the year 1929, 6,685 fires were reported in Canada. With the exception of 1922, this is the largest number of fires for any year on record. The area burned over was 6,029,749 acres, of which approximately two-thirds was non-forested. The total gross damage and loss is estimated at \$6,202,495. Considering the extreme conditions which prevailed, these figures reflect credit upon the protection organizations involved, inasmuch as in previous years,

(Continued on page 8)

CANADA'S RECREATIONAL WEALTH

Dominion Has Wide Appeal and Fame of Attractions Rapidly Spreading—Growing Tourist Movement

Canada's recreational resources are a national asset of the first order. They compose the lodestone which each year draws millions of visitors to the Dominion and they form a source of wealth which annually adds a large and rapidly growing item to the national income. There are, in fact few records in the annals of Canadian development more interesting or more remarkable than that

to the glorious panorama of a transcontinental trip across Canadian territory.

The charm of the Maritime Provinces is not easily depicted. These provinces—Nova Scotia, Prince Edward Island, and New Brunswick—are toned with the mellowness of age that captivates the visitor from newer regions. The snow-white lighthouse crowning the cliffs that overlook the sea, the white sail of the



Canada's Recreational Wealth—Salmon angling is one of the major attractions of the Maritime Provinces. The above scene shows the end of the struggle with the angler bringing a beauty within reach of his comrade's net.

of the rise to importance of the Dominion's recreational features. To-day the returns from these assets keep pace with those from such major factors as mines and forests.

Some idea of the extraordinary growth of holiday traffic may be gained from the records of touring automobiles entering Canada in recent years. In 1919 the number of cars entering Canada for touring purposes was 238,000 and during the ten years up to 1929 this figure had increased to 4,509,000. Aside from the phenomenal increase of motor tourists, railway and steamship lines each year add large numbers to the thousands who holiday in Canada. Tapping an even wider field than the automobile, these organizations have spread the Dominion's fame as a holiday land literally throughout the world.

The most casual traveller crossing the Dominion from east to west cannot but be struck by the sheer diversity of Canada's natural features. First there is the rugged Atlantic shore; then the great system of inland lakes, seas in depth and size; next a thousand miles of rolling prairie; followed by the great barrier of the Rockies, rivaling the Alps in grandeur; and finally the sea, bathing with its warm waters the far flung Pacific coast. All these contribute

fishing smack seeking its sheltering cove, the quaint fishermen's cottages that straggle up the hillsides, the shaded inland roads and winding forest streams, the springtime mantle of blossom that clothes mile upon mile of orchard valleys—all these suggest the elements that blend to give the Maritimes a picturesque peculiarity their own. In this setting is found all that goes to complete the happiness of the holiday visitor—excellent facilities for motoring, boating, fishing, hunting in season, and all outdoor recreation.

Reaching from the gulf of St. Lawrence to the head of lake Superior a voyage of 2,000 miles, one of the world's great systems of interior waterways traverses Eastern Canada. Nowhere exists an interior water route more varied than that traversed in a trip up the storied St. Lawrence, touching at historic Quebec and busy Montreal. Leading on through the Thousand Islands and the Great Lakes, past Toronto, Niagara Falls and a dozen other centres of commercial or scenic interest, such a voyage reveals the heart of Eastern Canada and leaves a vivid impression not only of the natural beauty but of the business life of this part of the Dominion.

(Continued on page 8)

NATIONAL PARKS FORM A GREAT NATIONAL ASSET

CANADA HAS AN EXTENSIVE SYSTEM

Areas of Outstanding Scenic and Recreational Importance Set Aside in Nearly Every Province

The coming season promises to be one of great tourist activity so far as the national parks of Canada are concerned. Officials, both of the Department of the Interior and of the railways, report an unusually large number of requests for information and advance bookings. Large numbers of inquiries have also been received in the department from motorists in practically every section of Canada and the United States, and even from Mexico. The majority of these ask for the shortest routing to Canada's national parks, a description of the different attractions, the accommodations and particularly the facilities for camping.

A comparative analysis of the various applications shows that by all odds strongest appeal of the parks is to scenic beauty and wilderness quality. An extract from one expresses the demand of many: "I want to visit parks containing the prettiest mountain scenery, as I want to camp out in the wilderness, fish and go mountain climbing." Some of these letters reveal that the writers know almost nothing of Canadian geography. They have heard a rumour of the greatness of the national parks of Canada and they write to ask where they are and how they can get to them. Apparently it has come to be accepted in the minds of the travelling public the continent over that national parks represent the finest examples of magnitude, power, and beauty in natural scenery, in a setting of unspoiled primitive conditions, and their name is now sufficient guarantee of their attractiveness.

Visitors to the national parks come with varied needs, some seeking health, others mere recreation, but the majority are impelled by a desire for rest and freedom. Whether they realize it or not they are usually seeking a way of escape from the increasing complexity and routine of our highly mechanized competitive life into a world of peace, solitude, and inspiring beauty. In the face of the majestic grandeur of the Rockies, the enchanting loveliness of such places as Lake Louise, the Yoho valley, Maligne lake or mount Robson, a man is lifted out of a pre-occupation with his purely personal problems into a kind of deeper satisfaction and healing of mind, passing, as has been said, "through wonder into joy."

(Continued on page 8)

CANADA'S SUCCESS IN DEALING WITH INDIANS

Radio Address by Dr. Duncan C. Scott Shows Progress of Dominion's Wards

Canada's remarkable success in dealing with her native proteges, the Indians, and the progress which they have made towards self-support and independence was described in a recent radio broadcast by Dr. Duncan C. Scott, Deputy Superintendent General of Indian Affairs. The Department of Indian Affairs was created in 1880 and the Minister presently in charge of its administration is the Honourable Charles Stewart. The future well-being of the Dominion's native wards has always been a matter of deep concern to Hon. Mr. Stewart and through his sympathetic interest and support the work of caring for the Indians has been advanced rapidly.

In the following word-picture, which is made up from extracts of Dr. Scott's address, is depicted the steady progress of the Indians under the guidance of the Department of Indian Affairs:—

"The first and most important idea underlying the administration of Indian Affairs is protection; that is to protect a dependent race in its lands, moneys, and its contact with the community. The Magna Charta of the Indians is the Proclamation of 1763 which set forth that no Indian could be dispossessed of his lands without his consent and the consent of the Crown, and the reason of our success with the management of Indians is based on that broad general principle. The sacredness of treaties and agreements with Indians has been respected in this country. No Indians have been driven from their lands by the land grabbers and no funds have been misappropriated. It would be too much to say that there have been no errors in administration, but they have not seriously affected the condition of the Indians nor disturbed the established policy. The Indians from the earliest times have appreciated their treatment by the British Crown. Their loyalty has been traditional. In 1776 and 1812 they gave valuable military assistance to our cause. In the Great War more than 4,000 Canadian Indians enlisted although they were expressly exempt from conscription. . . .

"At Confederation, Indian Affairs were vested in the Dominion Parliament, which alone can legislate for Indians and respecting lands reserved for Indians. . . . The law provides protection for the lands and properties of Indians, prevents exploitation of their real and personal estate, provides for their education, for the administration of their funds, and finally arranges for their enfranchisement and thus enables them to attain full citizenship. . . . The idea of protection led to the establishment of the reserve system. Special tracts of land varying in size have been set aside in all parts of Canada for their sole use and benefit. Indians are not restricted to these reserves, but are encouraged to occupy them and make the fullest use of their natural resources.

"Very early in the administration the necessity arose for the education of the natives, and the early missionaries began to instruct the Indians. Early in the 19th century schools were established and it was found that the best results came from residential schools. This has led to a wide development and we have 263 day and 78 residential, in all 341 Indian schools in operation, with a pupilage of 15,347. The Department has had the close co-operation of religious denominations in the education of the Indian. . . . The residential schools are conducted by the Anglican, Roman Catholic, Presbyterian, and United Churches. Education is free. In addition

HON. CHARLES STEWART AWARDED FIRST RANDOLPH BRUCE GOLD MEDAL

In the presence of a distinguished company, at the annual meeting in Toronto on March 7, of the Canadian Institute of Mining and Metallurgy, the president, Mr. Norman R. Fisher, presented the Randolph Bruce gold medal to Hon. Charles Stewart, Minister of the Interior and Minister of Mines, as being the member "who in the opinion of the Council had during the year immediately past, made the most notable contribution to the advancement of the mining industry of Canada."

The president in his presentation address explained that this medal, of which Hon. Mr. Stewart is the first recipient, is the gift of Hon. R. Randolph Bruce, Lieutenant Governor of British Columbia. It is to be awarded annually and is open to all classes of members. The Committee of the Institute charged with making the award, had, Mr. Fisher stated, reached a unanimous decision which it had set forth as follows:—

"The Committee therefore recommends that the Randolph Bruce medal be awarded this year to Honourable Charles Stewart for valuable services to the mining industry of Canada.

"By assistance to the coal mining industry of Canada, Mr. Stewart has aided in enlarging the markets for Canadian coal and in reducing unemployment in the mines.

"As Minister in charge of the administration of Dominion lands Mr. Stewart is responsible for important changes in the disposal and taxation of mining lands which are not only of benefit to the mining industry but in the public interest as well.

"As Minister in charge of technical mineral investigations he has encouraged and promoted these investigations to the benefit of the mining industry by providing laboratories and equipment for research investigations on fuels, for hydro-metallurgical and pyro-metallurgical investigations and for investigations in the treatment and use of non-metallics.

"In addition to those services to the mining industry of Canada Mr. Stewart has always maintained an attitude of sympathy and consideration with the needs and problems of the industry and has never spared any effort towards meeting those needs and solving the problems, his object being to so stimulate the development of our mineral resources that they would more fully meet the requirements of the economic and commercial life of the country."

Hon. Mr. Stewart in his reply declared that he was an optimist as regards the future of Canada and of the mining industry. Canada was a land of great resources. The position of her agriculture and the phenomenal rise of her forest products industry were well known and now mining was rapidly advancing. He had on the previous day considered the agreement to turn over to Saskatchewan the natural resources within her bounds. This meant that the three Prairie Provinces would henceforward directly control the development of their economic minerals but the Dominion Government would still assist them in this work, so far as was consonant with federal responsibility.

Activity in mining was now evident from Atlantic to Pacific and there was this further reason for optimism that whereas the value of agricultural and forest lands had long been known the mining industry had in the past few years made such advances that it promised to develop untold wealth from regions which had until half a decade ago been regarded as utterly worthless. There was every reason to believe that in the vast areas of the Northwest Territories and the Yukon, many parts of which were as yet unexplored, great mineral deposits would be discovered and that the development of these, along with those already known, would in a few decades make Canada one of the greatest, if not indeed the greatest, mineral-producing country in the world.

tion to the regular academic subjects the girls are taught domestic arts, and the boys agriculture, the care of cattle, and the use of ordinary tools. Considerable success has followed this plan. Elsewhere day schools meet more nearly the educational requirements. . . .

"Another matter of the utmost importance is the health of the Indians, subject as they are to tuberculosis and other maladies owing to their condition of life. The Medical Branch of the Department and a large staff of physicians located on or near Indian reserves administer sanitary regulations and relieve cases of actual sickness. . . . Hospitals have been established on the reserves; very general use is made of municipal and provincial hospitals and sanatoria, and the Indians with growing confidence rely upon scientific treatment for disease.

"The policy of the Department and the efforts of the staff are directed towards making the Indians self-supporting. In the older provinces of Ontario and Quebec they are leading the normal life of the ordinary Canadian citizen, either engaged in agriculture on the reserves or mingling with the general population. . . . The larger portion of the Indian population of Canada is west of lake Superior, and it was adopted in a primitive state by the Dominion shortly after Confederation. . . . These Indians have been made self-supporting in two generations; a remarkable transition. . . .

"Not to burden you with statistics but to give you an idea of the progress of

the Indians as indicated by their annual productiveness and the value of their property, I may say that their Trust Funds upon which the Government pays interest amount to \$13,500,000; last year over 1,800,000 bushels of grain were harvested; the value of their real and personal property is estimated conservatively at \$75,000,000; and their annual income at nearly \$10,000,000. They possess 2,200 reserves covering an area in excess of 5,000,000 acres. . . . The Indian population is over 108,000 . . . and the Indians are more than holding their own in point of numbers. Among the less civilized groups, the high birth rate balances a high death rate; but in the civilized tribes, who have withstood the first shock of contact with civilization, there is an appreciable gain, not only in numbers, but in physical standards. . . .

"In conclusion may I say that cautiously and safely, yet surely, we are guiding the Indians towards the goal which our policy has ever in view for them, and that is full citizenship and a permanent share in the life and prosperity of our Dominion."

Severe lightning storms accounted for a large number of forest fires in the southern interior of British Columbia and control was extremely difficult and expensive. Deficient rainfall, low humidity, and high winds aggravated the situation.

CONTROLLING THE WOLF MENACE IN THE NORTH

Bounty Paid on 938 Pelts by Department of the Interior in 1929-30 Fiscal Year

The Department of the Interior, through its North West Territories and Yukon Branch, wages a continuous fight to control the ravages of wolves among the wild life of Northern Canada. Realizing the tremendous toll taken annually by wolves, principally among the caribou, and the serious destruction caused along trap lines by the mutilation of the pelts of fur bearers caught in the traps, the Department has for a number of years been experimenting with various methods of control. The most effective scheme to date has been the increased bounty of \$30 per wolf pelt put into effect in 1924.

Under the regulations the hunter or trapper turns in the wolf pelt and receives the bounty, the pelt becoming the property of the Department. In this way the wolf is being made to pay for his own destruction as the money realized from the sale of the pelts at the fur auctions has greatly reduced the cost of the increased bounty system. Owing to the high prices which prevail in the fur trade for choice wolf pelts, not all of the pelts are turned in for the bounty but the record of those on which bounty has been paid and which have been forwarded to Ottawa during the fiscal year ended April 1, 1930, shows that 938 wolves were killed in the last twelve months as compared with 1,040 in the same period last year.

Wolves are the wariest of animals and their capture or destruction is extremely difficult. Hence the necessity of offering a large bounty in order to encourage trappers and hunters in their quest for these animals. Wolf bounties are paid through the various detachments of the Royal Canadian Mounted Police in the Northwest Territories, and the pelts turned in are forwarded to Ottawa by the District Agent at Fort Smith, N.W.T. The number of wolves destroyed during the 1929-30 period will no doubt be greatly increased with the receipt of the number sold to traders and for which no bounty is paid. These figures will be available with the close of the fur year in the North on June 30.

WESTERN LAND SETTLEMENT

There was a slight increase in the number of homestead entries and soldier grants made in February, 1930, as compared with the same month last year according to the figures compiled in the Dominion Lands Administration of the Department of the Interior.

The comparative table follows:—

Agency	Homesteads		Soldier Grants	
	1929	1930	1929	1930
Calgary.	45	20	1	1
Dauphin.	16	14	..	..
Edmonton.	156	214	6	12
Grande Prairie.	51	83	4	5
Kamloops.	1	2	..	..
Lethbridge.	15	13	..	1
Moose Jaw.	100	61	1	1
New Westminster.	2	2	..	2
Peace River.	62	127	4	1
Prince Albert.	186	157	6	6
Revelstoke. . . . .	..	1	..	..
Winnipeg.	20	20	2	..
Total.	654	714	24	29

Three Half-Breed Scrips were taken up in February this year as compared with one in the same period in 1929.

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CANADA'S FOREST FIRE LOSSES WERE HEAVY LAST YEAR

(Continued from page 1)

when the number of fires has been considerably less, the areas burned and the monetary losses were very much greater.

The following table compiled by the Forest Service, Department of the Interior, from returns made by the different forest authorities, gives in detail the figures for the year 1929 (subject to further slight revision) as compared with the average for the five-year period 1925-29, inclusive:—

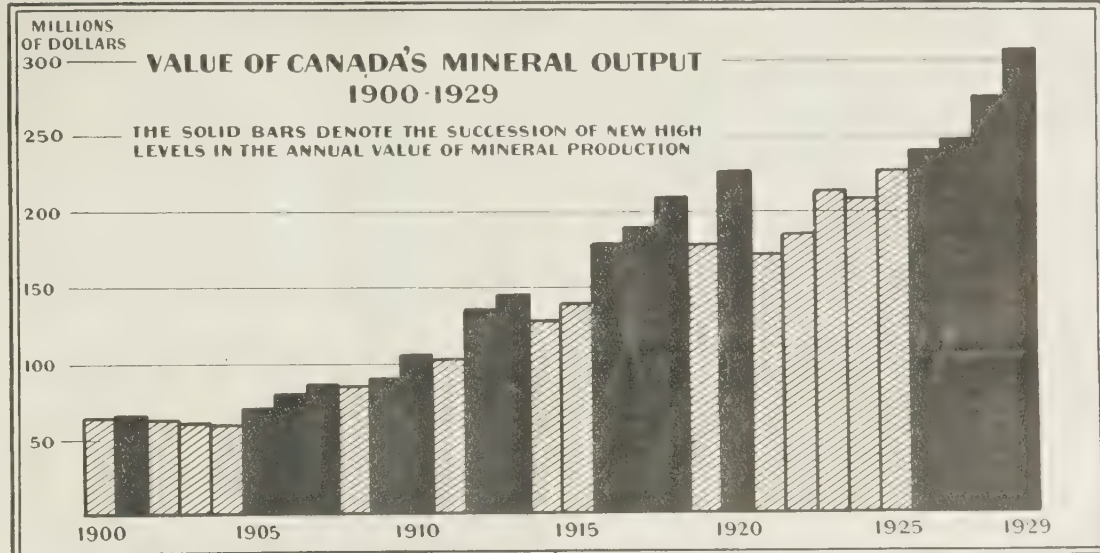
Item	Year 1929	Average 1925-1929 Incl.
Total Number of Fires..	6,685	5,146
Total Area Burned Over (acres)	6,029,749	2,319,074
<i>Merchantable Timber</i>		
Area Burned (acres) ..	674,226	376,223
Timber Burned (M.B.M.)	508,715	455,125
Timber Burned (cords) ..	2,008,366	1,684,691
Estimated Stumpage Value	\$2,379,946	2,532,868
<i>Non-Forest Growth</i>		
Area Burned (acres) ..	1,023,111	531,836
Estimated Value	\$2,004,759	1,013,925
<i>Cut-Over</i>		
Area Burned (acres) ..	324,965	172,161
Estimated Value	\$285,569	130,002
<i>Non-Forested</i>		
Area Burned (acres) ..	4,128,901	1,275,283
<i>Other Property Burned</i>		
Value	\$301,499	441,883
Actual Cost of Fire		
Fighting	\$978,120	630,624
Total Gross Damage and Loss	\$6,202,495	4,800,029

Maritime Provinces.—In New Brunswick and Nova Scotia, periods of extreme drought were recorded, which caused a great deal of anxiety to the fire protection forces. In New Brunswick, 162 fires occurred which burned over a total area of 3,374 acres causing a total loss of \$6,677, or the lowest on record for that province. In Nova Scotia, 353 fires burned over an area of 10,431 acres, causing a total loss of \$27,487, more than half of which amount includes actual fire fighting expenditure.

Quebec and Ontario.—In Quebec, the number of fires was slightly higher for 1929 than in the previous low record year of 1928. Likewise the losses sustained were extremely low. In Ontario, particularly in the western portion of that province, weather conditions of the most extreme nature prevailed to cause a fire season of particular severity and resulted in a very considerable loss to timber and young growth. The total number of fires occurring in Quebec and Ontario during 1929 was 1,986. Less than one-quarter of these occurred in the former province. The total area burned over was 626,759 acres, of which some 10,000 acres only were in Quebec.

Prairie Provinces.—As in 1928, extreme drought conditions of unparalleled continuance prevailed in a wide belt extending from northwestern Ontario across Manitoba, Saskatchewan, and Alberta. Alberta was the most fortunate of the three Prairie Provinces, while Manitoba and Saskatchewan passed through the worst fire season in their

CANADA'S REMARKABLE ADVANCE IN MINERAL PRODUCTION



During the thirty years embraced by the period 1900-29 inclusive, the annual value of Canada's mineral production has on no fewer than sixteen different occasions surpassed all previous marks. While the effect of the upward trend of prices must be taken into account, especially as regards the war period, this record is nevertheless a remarkable illustration of sustained growth. It stamps the mining industry as a foremost force in the march of Canadian development during the twentieth century.

The sheer increase in value—from less than \$65,000,000 in 1900 to well over \$300,000,000 in 1929—is amply impressive in itself. But the manner in which it has been attained is no less notable. There has been a great advance in variety of output. At the opening of the century gold and coal were the only two large items of Canada's mineral production, whereas the Dominion's present-day mining industry owes its magnitude not only to coal and gold, but to copper, nickel, lead, silver, zinc, asbestos, and, in short, to perhaps as wide a diversity of resources as any country affords to mining enterprise.

CANADA'S RECREATIONAL WEALTH

(Continued from page 1)

The Laurentian region—the huge horseshoe skirting Hudson bay to the east, south, and west—is pre-eminently the country of forest and stream, of hunting, fishing, and canoeing, of great unexplored areas. Countless lakes and rivers form a network of dustless highways routing the canoeist through a hinterland where trout, bass and muskonge, moose, deer and bear, stock a superb field for the sportsman.

The prairies are less familiar as a holiday region. Yet, for thousands of visitors, the fertile western plains with their endless miles of rippling grain present a scene of beauty and satisfaction to countless visitors. Beautiful summer resorts nestle on the shores of prairie lakes, and for the enjoyment of the sportsman few fields offer finer attraction than the hunting, in season, of prairie game birds.

For scenic splendour the Rocky mountains have been declared by many

experienced Alpine climbers to be unsurpassed. Majestic ranges, scarred by age and weather, rear their summits against a sky of purest blue or bury their snow-capped peaks in fleecy clouds. Glaciers and waterfalls, emerald tinted lakes and wooded valleys combine to entrance the eye and the enchantment is increased by the alpine air fragrant with the scent of pine and fir. The mountains are noted for their big game—bighorn sheep, grizzly bear, Rocky Mountain goat, elk, deer, moose, caribou, black and brown bear, and mountain lion.

Canada's Pacific coast, with its fiords and inlets, is a revelation to the tourist. Its moderate climate makes it an all-the-year-round playground for thousands, while its hunting, fishing, and other sporting attractions are unexcelled on this continent.

Taking into account the scope, the variety and the steadily widening renown of the Dominion's recreational attractions, there is ample ground for the view that these natural assets will, through their direct and indirect commercial effects, prove to be one of the major forces of Canadian development, in the next generation.

NATIONAL PARKS FORM A GREAT NATIONAL ASSET

(Continued from page 1)

This, in the final analysis, is perhaps the strongest appeal of the national parks. They supply something which answers to a universal craving, a hunger innate apparently in every human being and which must become more deeply felt as population increases and conditions of life on this continent grow more artificial and restricted. Already, the world over, there is a recognition that our present mechanical development may sweep original conditions everywhere away. That is, perhaps, one reason why the recent announcement of Hon. Charles Stewart, Minister of the

Interior, that he hoped the time would soon come when there would be a national park in every province, has met with such wide approval. The more far-sighted of our people realize that the changes which will probably come about in Canada during the next hundred years will be enormous. While Canada is already leading the world in the reservation of areas for national parks, it is recognized that the needs of the future are sure to be great and that the time to set aside areas of natural beauty is now, while the land is still unoccupied and primitive conditions in many parts still undisturbed.

Visitors to the national parks last year reached over half a million people but this travel, large as it is, is only in its infancy. The creation of new parks such as the Riding Mountain park recently set aside in Manitoba, the extension and improvements of federal and provincial motor highways now under way will provide new stimuli for travel and, incidentally, bring in new wealth to the Dominion. Expenditures of visitors to the parks range from a few dollars a day to as high as \$100 per day. One visitor to the Canadian West last year revealed that in addition to hotel and transportation expenses his party of four had spent \$6,000 during a three weeks visit, most of it with retail firms. Every new park created becomes an addition to our capital stock and increases our power of attracting tourists. It helps to swell the prosperity of the railway and steamship companies, hotels, lodging houses, retail and wholesale merchants, and in fact spreads out so as to affect every trade and industry.

The name national park has come to stand for such a high degree of excellence that once an area is set aside as a park, travel tends to flow to it in ever-increasing volume. Both in the returns they can give in health and happiness and in actual economic results the national parks must become an increasing national asset.

GEODETIC SURVEYS AND CANADIAN DEVELOPMENT

Form Accurate Basis For All Other Surveys
—Work in Hudson Bay Area

The Geodetic Survey of Canada, of the Department of the Interior, plays an important role in the development of the Dominion, providing by its work an accurate basis for all kinds of other surveys whether relating to the making of maps and charts, the laying down of interprovincial and other boundaries, or the construction of power-houses, dams, canals, railways, irrigation ditches and the like. Realizing the immense development in prospect as a result of the completion of the railway to Churchill on Hudson bay and the opening of the Dominion's latest seaport, geodetic engineers have been engaged in recent years in securing accurate information as to latitudes, longitudes, and elevations of selected points along the west coast of Hudson bay and inland along the railway.

During the summer of 1929 geodetic points were fixed at intervals along the west coast of Hudson bay as far north as the sixtieth parallel of latitude, which also marks the northern boundary of Manitoba. The exact spot where the Manitoba boundary intersects the shore of the bay is indicated by a monument setting forth that fact. Precise observations were likewise made to the east of Churchill harbour as far as cape Churchill where the coast dips sharply to the south. These precise astronomical observations of longitude and latitude are taken by officers of the Geodetic Survey of Canada by night with a powerful portable astronomical telescope. Seated in a small tent and surrounded by an array of complex instruments—chronographs, chronometers, electric switch boards, and radio sets for the reception of time signals—the geodetic engineer studies the stars, and in this way geodetic field astronomy is employed in providing the information for the accurate carrying on of future topographic, hydrographic, and geological investigations and surveys in that area.

An instance of the value of the information provided by geodetic triangulation was shown last summer. The Canadian Hydrographic Service completed the charting of Churchill harbour and the Hudson Bay route, based upon the determination of the geographical position of the port that was made by the Hydrographic Survey engineers in 1910. On the completion of the chart, an adjustment for the correction of the earlier values of the latitude and longitude of the port was made, by referring to the position as determined by the Geodetic Survey of Canada.

In 1910 the Canadian Hydrographic Service first commenced the work of charting the Hudson Bay route through Hudson strait to Nelson and Churchill, and survey vessels and parties of this Service were continuously employed upon this undertaking up to and including the autumn of 1914. The survey of Churchill harbour in 1910 resulted in the publication that year of a chart of the port, the first of a series of Canadian Navigational Charts and Plans of the route, a series which now number thirteen.

The Hydrographic Service resumed charting operations in 1928 and a survey was made of the coast from the entrance of Churchill harbour, eastward to cape Churchill. Last year, 1929, the Hydrographic Service steamer, *Acadia* made a charting of the coastal waters

CANADA'S AIR MAIL SERVICE

Growth of This New Branch of Post Office Department—
New Routes Opened This Year

Canada, with her vast area and widely scattered population, is advantageously situated to derive the greatest benefits from the development of internal air mail service. The great distances which separate the principal urban centres and the steady and broad-fronted advance in settlement and development serve to render postal communication by air peculiarly valuable in the Dominion.

to be arranged on definite time schedules and this involved a much greater problem. As a beginning a service was inaugurated by which incoming British mails were taken from transatlantic steamers and transported by air to Montreal, thus considerably hastening their delivery. Later, on October 1, 1928, a service of daily frequency was established between Montreal and



Canada's Air Mail Service—Inaugurating the International service between Montreal and New York. A Canadian Colonial plane taking on Canadian mail for Albany at the St. Hubert airport near Montreal.

In addition the Post Office Department of Canada has entered into a reciprocal arrangement with the United States postal authorities whereby Canada may take full advantage of the extensive United States air mail services connecting with points in Mexico, the West Indies, and Central and South America.

The establishment of Canada's official air post services is of comparatively recent date, but the conveyance of mail matter by air within Canada has been an actual fact for over ten years. In the early days of mail transportation by air, the Post Office Department, as a temporary measure, gave permission to the operating aviation companies to carry letters, entirely at the senders' risk and subject to a small fee ranging from five cents to twenty-five cents per letter, in addition to the regular postage. This fee was retained by the operating company. The successful operation of numerous "sticker" services demonstrated beyond question the essential practicability of air mail transport in the Dominion, for these services were conducted in many cases under considerable operating difficulties although not on hard-and-fast schedules.

Civil aviation in Canada assumed proportions in 1927 which justified the Post Office Department in utilizing the facilities available for the fast transport of mails, not only to remote areas but between the larger centres of population. Services of the latter type had of course

in the vicinity of Churchill, locating hidden shoals, reefs, and rocks in the approaches, and sounding and charting the coastal waters for a distance of twenty nautical miles off-shore. The result of the past two seasons' operations will be the production of a navigational chart from cape Churchill to Churchill harbour.

Toronto and on the same day an international air mail route was opened between Montreal, P.Q., and Albany, N.Y. On July 15, 1929, the Montreal-Toronto route was extended to Detroit, via Hamilton, London, and Windsor, Ontario, and thus a point of contact with the United States air mail routes westward was established, in addition to providing the most densely populated portion of Ontario with speedy air mail service. On the same date a still further connection with southern air mail routes was provided by the establishment of daily service between Toronto and Buffalo. Notwithstanding the difficulties of operation in the Maritime Provinces—scarcity of suitable landing fields, densely wooded areas, broken country, and fog—the Postmaster General inaugurated a service early in December, 1929, between Montreal, Quebec, Moncton, and Saint John.

The next major development in Canadian Air Mail Service was the inauguration of the trans-prairie route on March 3, 1930. Planes are now operating daily between Winnipeg, Regina, Moose Jaw, Medicine Hat, and Calgary and between Regina, Saskatoon, North Battleford, and Edmonton on a schedule which clips a full twenty-four hours off the transcontinental movement of Canadian mails. This not only constitutes a marked advance towards the coast-to-coast service which is being developed link by link but revolutionizes intercommunication between the provinces of Alberta, Saskatchewan, and Manitoba.

It is in the outlying portions of the country, however, that the most valuable work of Canada's Air Mail Service has been carried out. Until recently the remote settlements along the north shore of the St. Lawrence river, on Anticosti and the Magdalen islands in the gulf of St. Lawrence, and along the sub-arctic

PETROLEUM PRODUCTION IN ALBERTA IN JANUARY

Comparative Statement Showing Output at
Beginning of 1930 and During Same
Period Last Year

The following table shows the production of oil in Alberta fields during the month of January with comparative figures for the same period last year. The figures were compiled in the Department of the Interior from the returns of operators. The naphtha was produced in the Turner Valley field; the light crude in Turner Valley and Red Coulee (Coult's) fields; and heavy crude in the Wainwright field. Of the January, 1930, total of light crude, 6,664 barrels came from the Turner Valley field.

The comparative figures of production follow:—

		Light Naphtha	Heavy Crude	Total
		60° or over	30° to 60°	
January, 1930..	82,036	8,454	1,068	91,558
January, 1929..	33,107	7,431	129	40,667

reaches of the Mackenzie river, have been almost cut off from the outside world during the winter months. Communication was necessarily by dog team and other primitive methods until the recent dramatic change to swift aeroplanes reduced the duration of mail trips from weeks to hours.

The establishment of contract air mail service in the Mackenzie River District—the most northerly of all air mail services—in December, 1929, attracted world-wide attention. The route from McMurray, down the Athabasca river, along the south shore of Great Slave lake, and down the mighty Mackenzie river is nearly 1,700 miles long. Hitherto, in winter months, dog teams had been the sole means of conveyance and the volume of mail was correspondingly small being limited to letters and a few newspapers. The total amount for Aklavik in the winter of 1928-29 was less than two hundred pounds. Contrast this with the remarkable conditions obtaining on the advent of air mail facilities. Ten thousand pounds of mail were carried on the first flights—over a thousand pounds alone for Aklavik at the mouth of the Mackenzie.

The chief remaining routes are those which penetrate the rich mining areas of Ontario and Manitoba, i.e., Red Lake, Kissinging, and Bissett. They are the principal mineral areas served by air mail in Canada.

The development of flying fields and provision of lighting facilities, not to mention the constant improvements in aircraft which may be expected during the next few years, will undoubtedly do much to facilitate the performance of regular scheduled air mail services within Canada. Meanwhile the efficiency percentages maintained by the different operating companies are remarkably high. In addition to holding the world's record for speed over contract air mail lines, the Canadian service proudly boasts that it has never lost a single piece of mail out of the hundreds of tons that have been entrusted to it.

A remarkable feature of the 1929 forest fire situation in Manitoba and Saskatchewan was that fires occurred and were fought in every month of the calendar year.

During the 1929 forest fire year on the northern wooded fringe of the Prairie Provinces some precipitation occurred but for the most part the wooded sections of this region suffered severely from lack of rain and the consequent fire outbreaks.

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DEVELOPMENT OF WATER POWER IN SASKATCHEWAN

PROGRESS AT ISLAND FALLS PLANT

Province's First Major Undertaking Will Be in Operation Before Close of 1930

For many years water-power installation in the province of Saskatchewan has been confined to a small water-driven mill operated by the Roman Catholic Mission at La Plonge, north-west of Prince Albert. Therefore the commencement of the development at Island Falls on the Churchill river, under licence from the Department of the Interior, by the Churchill River Power Company, a subsidiary of the Hudson Bay Mining and Smelting Company, was an event of some significance. It not only represented the birth of an industry in the province but also demonstrated that the mineral field on the boundary of Manitoba and Saskatchewan was to give rise to a new mining industry.

The undertaking is being carried out in unsettled country, seventy miles distant from the nearest railway, so that the first problems to solve were those of organizing transportation, capable of conveying the many tons of machinery and material to the site and of providing accommodation and subsistence for upwards of seven hundred men engaged upon the work. As there were no roads in this area it was necessary to arrange to move all heavy material and as much of the other supplies as possible over frozen ground and ice. For this reason during the winter of 1928-29 huge quantities of stores were laid down at the site. Another problem was that of securing an adequate supply of power for construction purposes which was solved by the erection of a temporary hydro-electric plant on a nearby tributary of the Churchill river and installing therein the two 1,000 horse-power service units destined for the main development. The advantage of this solution was that it obviated the transportation of other machinery and eliminated the question of fuel. By the time that the spring of 1929 opened, therefore, everything was in order for rapid progress on the main works during the open season, and the Department of the Interior assigned one of its engineers to act as resident inspecting engineer at the site.

The works consist of power-house, under-slucies, and stop-log sluices across the main channel; a control dam with power-house; and several low earth dams across low spots in the shore of the forebay. The works will create a head of 56 feet at the site where it is pro-

(Continued on page 8)

WILD LIFE IN NATIONAL PARKS

Canada's Great Scenic Playgrounds Form Natural Reservoirs From Which Surrounding Areas Are Re-stocked

A dispatch to the Commissioner of National Parks, Department of the Interior, from A. Bryan Williams, Game Commissioner of British Columbia, announces the safe arrival of the carload of elk recently shipped from Buffalo national park, Wainwright, Alberta, to the Queen Charlotte islands. The animals are a donation by the Dominion to the Provincial Government for re-

described this era as the close of the age of mammals. From every part of the world in the last quarter of a century have come reports that wild life was being destroyed at a far greater rate than it could reproduce itself. The inevitable spread of civilization, with its concomitants—the breaking up of land, draining of swamps, felling of forests and many other operations—has been



Wild Life in the National Parks—View along a motor road in Banff national park, Alberta, showing mountain sheep quietly grazing while their photograph is being taken. Wild animals seem to realize that they are protected while they are within park boundaries and become very tame. (Inset) Fine specimens of elk and buffalo in Buffalo national park, Wainwright, Alberta.

stocking purposes on these islands. They were captured from the wild elk herd, now numbering over 600, roaming the Buffalo reserve and were particularly fine specimens of their kind. They were cut out of the main herd by the park riders a few weeks ago, corralled until safe to handle, and then placed in specially constructed crates. Through the co-operation of the Canadian National Railways, a special baggage car was provided which was attached to the regular passenger train for Prince Rupert and went through express to that port. Here the elk were transferred to a boat sailing to the Queen Charlotte islands. No loss or injury was sustained in transit and according to the report the animals are already settling down and adapting themselves to their new surroundings.

The successful transfer of wild animals as large as these by rail and water for over 1,000 miles was in itself an achievement but the greatest interest attached to the undertaking lies in its significance from the conservation point of view. A scientific philosopher has

destroying, the world over, the natural homes of big game. In recent years, too, the forces of destruction due to mechanical invention and greater facilities of transportation have increased enormously, and disastrous inroads have been made in many species.

A few years ago there was organized in England a conservation movement known as the Society for Preservation of the Fauna of the Empire. Its president, the Rt. Hon. the Earl of Onslow, in reviewing the depletion of wild life throughout the Empire to-day, stated that the only satisfactory method of ensuring the preservation of wild animals in the far distant future is by the formation of sanctuaries or the establishment of national parks. As an example of what could be accomplished, he cited the policy of the National Parks of Canada.

It will be recalled that about twenty years ago the national parks of this country were made game sanctuaries not only in name but in fact. An adequate system of warden patrols was established

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PREPARE FOR SEASON'S WORK IN FAR NORTH

EXTENSIVE PROGRAM IS ARRANGED

Many Officers of Department of the Interior Will Spend Summer in Northwest Territories

The growing importance of Canada's Far North is indicated in the extensive program now being arranged by the Department of the Interior through its North West Territories and Yukon Branch for its work in the Territories during the coming season. The activities and projects contemplated include arrangements for the reception and establishment of the Government reindeer herd, the enlargement of the medical service, the organization of the warden patrol in Thelon Game Sanctuary, the extension of the 1930 voyage of the Department's expeditionary ship, and the opening to prospectors of the Coppermine mineral reserve.

During the coming year most of the areas in the Northwest Territories where there are trading posts and settlements will be under active medical surveillance. Dr. Livingstone, senior medical officer, has already left for Churchill from which point he will travel by dog team to Chesterfield, where the Department of the Interior has built a house for his accommodation. He will visit all the Eskimo settlements en route. With Chesterfield as a centre, Dr. Livingstone will be in touch with Baker Lake and the other important posts in the districts on the west side of Hudson bay. He will remain in charge of this post until the arrival of the Department's patrol ship *Beothic* early next autumn, when he will be replaced by the ship's doctor. Dr. Livingstone will return to North Sydney on the *Beothic* and will later proceed to Fort Smith, N.W.T., which is the Department's headquarters for the District of Mackenzie. At this point there is a large mission hospital, and he will take over the duties of the retiring medical health officer and have general supervision of the medical work of the district. The scattered nature of the medical work in the Mackenzie delta and Arctic coast to the east and west, under Dr. J. A. Urquhart stationed at Aklavik, has necessitated improved means of transportation, and to meet this a motor hospital boat has been built at Edmonton and with the opening of northern navigation will be taken to Fort Smith. From this point it will proceed under its own power to Aklavik and at the same time carry Mr. J. F. Moran, chief inspector, on his annual tour of the Mackenzie district. Other departmental medical

(Continued on page 8)

EXTEND MOTOR ROADS IN NATIONAL PARKS

Work on Main Highways Will Be Advanced
This Year—Scenic Beauty of
Mountain Roads

The road-building program in the National Parks of Canada for the present season is an extensive one, containing many important items, and in addition several of the provincial governments are constructing sections to connect leading provincial highways with the roads within the parks.

The National Parks Branch of the Department of the Interior has begun active construction work on the eastern end of the Big Bend highway north from Donald, British Columbia. This is, perhaps, the most notable undertaking of the entire program because it will make possible the first all-Canadian continuous highway from the prairies to the Pacific coast. Up to the present time motorists proceeding to the Pacific coast from the East have had to pass through United States territory or to ship their cars part way by boat or rail.

The British Columbia Government will also be at work on the western end of the highway, and the two forces will meet at Boat Encampment on the Big Bend. It is anticipated that this road will be opened in 1932. It is expected work will be completed by the Province this year on the road between Fernie and Corbin. This is another link in the provincial highway which will eventually connect with the Akamina road through Waterton Lakes park, Alberta, and establish another through route across the Rocky mountains. The British Columbia Government also, contemplates continuing work on the roads from Prince George southeastward to the Yellowhead pass, and from Kamloops northeastward up the North Thompson river towards the same point. The Dominion Government has already made a survey through Jasper park for a road which will connect these roads when they reach the park boundaries. This will eventually provide two new highways to the Pacific coast and a scenic loop linking up with the Kicking Horse trail and Big Bend road which will be unsurpassed as a touring route.

In Jasper park, Alberta, an additional seven miles will be constructed on the motor road to the Miette Hot Springs, completing the work begun last year. These springs are very similar to the famous hot springs at Banff in Banff national park and have a somewhat higher temperature. Many remarkable cures have been reported from their use. In the past invalids have had to be carried in over a difficult trail and the present highway will provide convenient and easy access. The construction of the road presents many engineering difficulties, a good deal of rock work, and the building of two large bridges.

Work on the provincial highway to the eastern boundary of Jasper park from Edmonton is expected to proceed this year. This road will connect with the already completed Jasper Park highway, providing access to Jasper park from the prairies. Improvements on the provincial highway from Pincher Creek to Waterton Lakes park, which was practically regraded last year, will establish better connections with this delightful reserve from the north. In Waterton Lakes park further improvement will be made on the Akamina highway. On the main park highway a new trestle bridge 350 feet long will be built over

CANADA'S BEEF CATTLE INDUSTRY*

Department of Agriculture Co-operates With Ranchers in
Studying Problems of Industry

Previous to 1912, when the beef cattle industry in Canada was in a thriving condition, a very small investment, outside of that in cattle, was necessary to carry on the business. With the coming of the settler, and the consequent splitting up of the open range, the rancher was confined to a definite area. This change necessitated a more economical use of the range and the construction of fences, the development of watering places, and the production of winter feed. With these increased costs more attention was paid to the class of cattle raised, the percentage calf crop, and the death losses. Although the best known grazing practices were followed there was a decline in the carrying capacity of the ranges, and many areas became badly overgrazed. The result was depleted pastures, less thrifty cattle entering the winter, and sub-normal gains in weight by marketable and breeding cattle.

It was not until 1925 that a demand arose for experimental work on the range, and following a survey in 1926 by the Dominion Experimental Farms, Department of Agriculture, it was decided to conduct experiments on the short grass plains to study methods of range management, with the object of improving the carrying capacity. As the outright purchase and equipping of an experimental ranch appeared to be unwise because of the large cost involved, it was decided that it would be more economical and more useful to co-operate with some rancher who had a long experience in ranching. Gilchrist Brothers of Medicine Hat, Alberta, offered their co-operation, which was accepted and the experiments are now being carried out on this ranch.

The main project under investigation is known as the deferred and rotation system of grazing. It is usually carried out on three pastures, depending upon the conditions under which it is practised. The system is designed to defer grazing on each pasture twice in six years to allow each pasture to mature a crop of grass. On the station, four fields, each comprising 3,740 acres, are used to determine the practicability of the scheme. The fourth field is grazed continuously and serves as a check on the other three fields. In order to determine the efficiency of this system of grazing as a whole and whether or not the grass cover is improved, a thorough study of all factors affecting it is made.

An essential factor in range management is a reliable water supply. In this connection the development of natural watering facilities is being investigated.

the Waterton river, replacing the present trestle bridge. In Elk Island park, Alberta, a new road completed last year around lake Astotin will be extended towards the south gate.

Both Alberta and British Columbia propose to further improve the road across the Crownstest pass on which considerable work was done last year, particularly by the province of Alberta. The latter province has now a fine gravel road to the pass.

In Prince Albert park, Saskatchewan, construction will be begun on a new road from Waskesiu lake to the Narrows at the northern end of the lake, opening up a large section of the park to motor visitors.

Other factors in range management being studied include the use of salt, the gains in weight by different classes of cattle, the possible limits of the grazing periods, the palatability and nutritive value of the range vegetation, the question of deterioration in the feeding value of hay kept several years in reserve, and the effect of frequent cutting on range hay production. As fencing occupies an important place in the ranch operations, the use of wood preservatives for the posts and cost of construction and maintenance are also being investigated.

In addition to the projects at the range station there are several other investigations being conducted in Alberta, Saskatchewan, and British Columbia, including an economic study of the vegetation, reseeding tests on burnt-over land, and a number of trials in the growing of forage crops for winter feeding. A beginning has been made on the study of the cost of production of range cattle in the different grazing areas, the object being, first, to learn the financial importance of different factors in the cattle business; secondly, to present a fair picture of the industry, and thirdly, to analyze the business for the purpose of learning which are the most profitable range practices to follow in the different locations.

New projects to be studied during 1930 will be the determination of the carrying capacity of the range land on the short grass plains, the winter feeding of cattle, the use of home-grown roughages and their economic value for hastening younger steers to maturity, and the value of supplemental feeding to cows on winter pasture.

When more complete information is available on summer grazing, winter feeding, and on cost of production, a fairly complete knowledge of all phases of the cattle industry will be available.

**Prepared at the direction of Dr. J. H. Grisdale, Deputy Minister of Agriculture, by Mr. E. S. Archibald, Director, Dominion Experimental Farms, Ottawa.*

PETROLEUM PRODUCTION IN ALBERTA IN FEBRUARY

Output For 1930 Period Higher Than For
Corresponding Month Last Year

Petroleum production in Alberta during the month of February, 1930, and during the corresponding period last year is shown by the following figures compiled in the Department of the Interior from the returns sent in by operators. All of the naphtha was produced in the Turner Valley field; light crude came from the Turner Valley and Red Coulee fields; while the heavy crude was produced in the Wainwright field. Of the total of 7,518 barrels of light crude reported during February, 1930, 6,338 barrels came from the Turner Valley field.

The comparative figures follow:

	Naphtha	Light Crude	Heavy Crude	Total
	60° or over	30° to 60°	30° or under	
Feb., 1930 ..	73,350	7,518	1,071	81,939
Feb., 1929 ..	36,174	7,567	491	44,232

ATTACKING PROBLEMS OF OUR MANUFACTURERS

Forest Products Laboratories Engaged in
Study of Various Kinds of Glue

A few years ago in Canadian commerce and industry glue was simply an adhesive substance which was sold and used without generally recognized standards as to quality. To-day, however, increasing need for economy and efficiency in all our industrial processes, in order to keep pace with world-wide advances, demands that the various kinds of glue should be differentiated, and their qualities made known so that the manufacturer can secure without fail the agent that exactly fits his requirements. One manufacturer needs an adhesive to be used in furniture that will last for fifty years, and, in other cases, men's lives will depend upon the strength and water-resisting qualities of the glue employed in the making of automobiles and aeroplanes.

The Forest Products Laboratories of the Forest Service, Department of the Interior, have for some years been making a careful study of this commodity, in line with researches carried on in all progressive industrial countries. The experimental work in relation to glues which is under way at the Forest Products Laboratories includes the fixing of Canadian standards; tests for making improvements in glues used by paper-box manufacturers; investigations of glues composed of vegetable casein; detection and elimination of bacilli; and the improvement of water-resisting qualities. When the schedule of glue standards is completed by the Laboratories, users will have at their disposal a quality number, so that Canadian glues may be identified, "Canadian No. 1," for example, representing exactly what the designation implies. In view of the fact that glue can be adulterated in many ways, the advisability of this schedule of standards is apparent.

In setting up paper boxes, silicate of soda, a mineral glue, is of great utility, and in connection with this a number of experiments are being carried out. The other new glue under observation, namely, vegetable casein, is a by-product of the manufacture of soy bean oil. This residue, known as soy bean flour, previously a waste product, has been rescued by scientific investigation and is likely to become very important as an adhesive, particularly in the manufacture of plywoods.

Many destructive microbes attack glue, and it is the aim of the Forest Products Laboratories to discover the causes and means of prevention of this source of damage, as also the best method of securing resistance against water. Owing to its water-resisting properties casein glue is of special use in aircraft manufacture, and great quantities are required in the manufacture of veneers of flying boats, pontoons, etc. The Forest Products Laboratories are endeavouring to remove the tendency of this glue to stain wood. One of the best water-resisting glues known is made from ordinary animal blood. It is employed principally in veneering where water resistance is an important factor.

Most of the more generally used glues are proteins and in common with other substances in that classification a great deal remains to be learned about them. Much research has been carried on in the laboratories of the principal manufacturing countries of the world and the Forest Products Laboratories of Canada are engaged in attacking many problems of glue producers and consumers for the ultimate benefit of the whole field of industry.

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OTTAWA, MAY, 1930

PREPARE FOR SEASON'S WORK IN FAR NORTH

(Continued from page 1)

officers in the Territories are Dr. R. D. Martin at the mouth of the Coppermine, and Dr. H. A. Stuart on Baffin island.

Preparations for the reception of the reindeer herd of 3,000 head, now on its way overland from Alaska, which will arrive early in 1931, will be completed this year. Mr. R. T. Porsild has arrived at Aklavik by aeroplane and will supervise the erection of corrals and buildings on the range east of the Mackenzie delta.

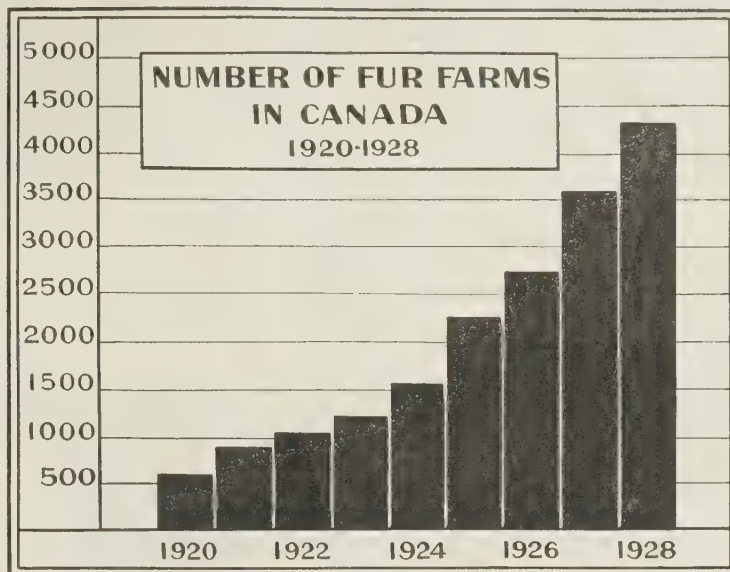
The Coppermine mineral reserve will be opened for staking on July 1 and Major L. T. Burwash, who made an inspection of this field in 1929, will go in by aeroplane early in the season so as to be on the ground as soon as possible. Later, if conditions permit, he will fly to King William island to carry on further investigations with regard to the fate of Sir John Franklin.

The organization of the regular patrol of the Thelon Game Sanctuary for the protection of wild life, particularly the musk-ox, will be completed this year. Mr. W. H. B. Hoare, who returned last autumn after a twenty months' investigation of the area, will go north to superintend the erection of warden cabins at the east and west ends of the sanctuary and the establishment in the reserve of wardens and native helpers.

This year's cruise of the Department of the Interior's expeditionary ship *Beothic* will be slightly different from that of former years in order that she may enter Lancaster sound after the ice has moved out. If conditions then permit she will proceed to Winter Harbour, Melville island and renew the supplies in the cache established by Captain Bernier of C.G.S. *Arctic* in 1908-9, which proved of such service to the northern party of the Canadian Arctic Expedition of 1913-18, and to Inspector Joy of the Royal Canadian Mounted Police during his notable winter journey of 1,800 miles in 1929.

In addition to her usual work in carrying relief personnel and supplies to the various posts in the Canadian Arctic archipelago, the *Beothic* will take to Lake Harbour, on the southern shore of Baffin island, sufficient lumber and supplies to erect a house for a resident officer there. This house will be occupied for the next two years by Mr. and Mrs. J. Dewey Soper. Mr. Soper will continue his investigations respecting the blue goose and its nesting ground, will survey certain parts of the shore line, and make observations in regard to terrestrial magnetism. Mrs. Soper, who is a trained nurse, will be of great as-

GROWTH OF FUR FARMING IN CANADA



Unattended by any great degree of publicity, such as marked its earlier and more hectic stages of development in pre-war days, the Canadian fur-farming industry has lately been forging ahead at an almost incredible rate. According to the figures issued by the Dominion Bureau of Statistics the number of fur farms increased from less than 600 in 1920 to over 4,300 in 1928. And in the same period the value of fur-farming property—lands, buildings and fur-bearing animals—rose from roundly \$6,000,000 to \$22,600,000.

Perhaps the most notable feature of this expansion has been the spread of the industry clear across the country. Not so long ago fur-farming, as a real business, was associated almost exclusively with Prince Edward Island. The Island is still the outstanding centre but it is closely followed by Quebec and Ontario, and there is now not a single province of the Dominion in which the value of fur-farming property is less than a million dollars.

DEVELOPMENT OF WATER POWER IN SASKATCHEWAN

(Continued from page 1)

posed to install initially three 14,000 h.p. units and the two above mentioned service units. Ultimately there will be six 14,000 h.p. units installed.

The contractors concentrated their efforts initially upon the power-house with the result that by the time freeze-up arrived the building was virtually completed, closed in, and heated so that the contractors for the hydraulic and electrical machinery could work under satisfactory conditions. Construction of the under-sluices was also pressed in order that the flow of the river could be accommodated when the north end of the channel was closed off.

At the present time the turbines for units Nos. 1 and 2 are virtually completed and the installation for unit No. 3 is in progress. The generator for unit No. 1 is proceeding; the stator is now ready and the rotor is being built up. Other work in the power-house, such as the erection of partitions, operating galleries, and stairways, is making rapid progress as is the installation of transformers, switchboards, and wiring. The underwater sluices are completed, the gates installed, and the erection of the cofferdam, to close off the sluiceway portion of the power-house section of the

sistance in cases of illness among the natives.

The services above mentioned are, it will be noted, nearly all additions to the administrative work of the North West Territories and Yukon Branch, which has been steadily growing for many years, and they show both the increased interest which citizens are taking in Northern Canada and the forethought which the Department of the Interior is exercising to ensure that the needs of the Territories will be adequately met.

work, has been begun. In fact taken as a whole the power-house section of the undertaking is upwards of 90 per cent completed and preparations are now being made to concentrate upon the control and cutoff dams.

In addition, the erection of the transmission line to carry the power to the Flin Flon mine is well advanced, and a further line is being erected to carry power from this line to the Sherritt-Gordon properties. There does not appear to be any doubt, therefore, that the Island Falls plant will be supplying power for mining before the close of 1930.

WILD LIFE IN NATIONAL PARKS

(Continued from page 1)

and the regulations rigidly enforced. As everyone knows the results have surpassed the most sanguine anticipations. Sheep, goat, bear, elk and deer, which had practically disappeared from these regions, have now come back in such numbers that the parks have become the wild life reservoirs of the West. The British Columbia Government has been drawing on them to re-stock its own depleted game areas. Two regions in the southern part of the province in recent years have been stocked with Rocky Mountain sheep—that much prized trophy of the sportsman. Two or three years ago a herd of elk was also shipped from Buffalo park to re-stock areas between the Okanagan and Kettle valleys. The National Parks of Canada have also been able to furnish from their increasing stocks, big game animals for zoological exhibits or as nuclei for conservation experiments in various parts of the world.

These results prove clearly the truth of Lord Onslow's contention in a recent report, that an ultimate world bankruptcy in wild life need not be accepted as inevitable. While adequate protec-

ORIGIN OF NAME OF ROCKY MOUNTAINS

Geographic Board of Canada Gives Earliest
Reference to Present Name

In his diary while Governor of York factory on Hudson bay in 1716, James Knight notes the arrival of a band of "Mountain Indians" with whom he had "a great deal of discourse." They told him their country was "very mountainous and of a prodigious height. . . . so they cannot see the tops without it be clear weather. . . . The sea lies but a little way to the westward of the mountains." This is the earliest reference to the Rocky mountains in the records of the Geographic Board of Canada.

In 1730 Beauharnois, the French Governor, transmitted to France a sketch which the Indian, Ochagach, had drawn for La Verendrye showing the Grand Portage route to Western Canada from lake Superior. This map indicates the "montagnes de Pierres Brillantes," a name which is found in translation "mountains of Bright Stones" on Jonathan Carver's map, 1778.

The mountains are referred to by their present name in Legardeur de St.-Pierre's Journal of 1752. He calls them "montagnes de Roche." The name is a translation of the Indian name, which in Cree is *assinwati*, in Stoney *niaba* and in Blackfoot *mistokis*. Viewed from the prairies, the Rockies present a great wall of rock.

INCREASED ACTIVITY IN WESTERN LAND SETTLEMENT

More Homestead Entries and Soldier Grants
Made in March, 1930, Than in Same
Period Last Year

There was a substantial increase in the number of homestead entries and soldier grants made in Western Canada during the month of March of this year as compared with the same period in 1929. A comparative table compiled in the Dominion Lands Administration of the Department of the Interior follows:—

Agency	Homesteads		Soldier Grants	
	1929	1930	1929	1930
Calgary	43	29	1	2
Dauphin	24	17	..	..
Edmonton	226	277	9	13
Grande Prairie	129	148	9	8
Kamloops . . . . .	..	1	..	..
Lethbridge	41	22	..	1
Moose Jaw	136	97	6	2
New Westminster	5	2	..	1
Peace River	121	155	11	9
Prince Albert	239	409	2	32
Revelstoke . . . . .	..	2	..	..
Winnipeg	28	29	..	..
Totals	992	1,188	38	73

tive measures, he pointed out, will help to maintain the stocks, it is only through the creation of national parks such as have proved so successful in Canada, that the final rescue of many species can be assured. Canada, he declared, is setting an example in conservation to other countries and its abundant success is a happy augury of what others may achieve.

Cambridge bay, Victoria island, was named by Thomas Simpson in 1839 after H.R.H. Adolphus Frederick, 6th Duke of Cambridge (1774-1850) and 7th son of George III. Thomas Simpson was a cousin of Sir George Simpson, Governor of the Hudson's Bay Company. Along with an experienced H.B.C. officer, Peter Dease, he explored the Arctic coast from Alaska eastward in the years 1836-39.

REMARKABLE CLASS OF STARS ARE STUDIED

**Dominion Astrophysical Observatory
Advances New Theory Regarding
Wolf-Rayet Stars**

The most puzzling class of stars in the sky is that of the Wolf-Rayet stars, so called because their peculiar character was discovered by the astronomers Wolf and Rayet at the Paris Observatory in 1867. They were examining some stars visually by a spectroscopic, an instrument which spreads out the light of the star into a rainbow coloured strip called the spectrum from which, at the present time, information about the chemical constitution, the physical condition, the motion and distances of the stars can be obtained. For about 999 out of every 1,000 stars the spectrum is a continuous strip of colour, the colours changing gradually, as in the rainbow, from red to violet. This rainbow coloured strip is crossed by dark lines and occasionally by a few narrow bright lines. It is from the positions and the character of the spectral lines that the elements present in the star are determined and that its speed towards or from us is measured. Wolf and Rayet were astounded to find a star in Cygnus which instead of the usual narrow dark lines had only broad, very bright coloured bands superposed on the continuous coloured strip. Such a peculiar spectrum created a great deal of speculation and though about thirty are now known in the northern sky and more in the southern, they have remained for over sixty years as puzzling and enigmatic as they appeared when first discovered.

Observations which have been carried on at the Dominion Astrophysical Observatory, Victoria, B.C., for some years have brought to light new information about these peculiar objects and have made it possible to bring forward a satisfactory theory of the cause of the broad, bright bands, which are a unique characteristic of the spectra of these particular stars. Measurements of the widths of the bands show that the only reasonable explanation of the great widths and of the difference in width at different parts of the spectrum is that the star is continuously and violently shooting off matter in all directions into space. There is a constant stream of atoms travelling outward from the star like a tremendous volcanic eruption over every part of the surface. These ejected atoms reach almost unimaginable speeds, sometimes as great as 1,000 miles a second, nearly 10,000 times as fast as man has ever travelled artificially, at the 368 miles an hour aeroplane speed record. The space surrounding the star will be filled with this outward moving gaseous matter, which is rendered luminous by the light of the star itself and produces the broad, bright bands which make the spectra of these stars such striking and puzzling objects.

It has long been known that light exerts a pressure on any body on which it falls, and it is believed that the light pressure in these stars is so much greater than the gravitational pull as to cause this high speed ejection of atoms. With the matter continually streaming off from every part of the surface there must result a considerable loss of stellar material and it has been calculated that these stars will lose millions of millions of tons of this atomic matter in the course of a day. So massive are the stars, however, that even this tremendous loss of matter continuously thrown off into space for hundreds of millions

WELLAND CANAL NEARS COMPLETION*

**Important Link in Great Lakes Route to be Opened on
July 1 Next**

The Welland Ship Canal which is to be opened to traffic on July 1, 1930, is one of the principal links in the great chain of navigation from the strait of Belle Isle up the St. Lawrence and through the Great Lakes to the western end of lake Superior, a distance of 2,339 miles. In considering the historic and romantic background of this vital artery of Canada's trade for the past hundred



Welland Ship Canal—A recent aerial photograph of the flight of twin locks down the face of the escarpment between lakes Erie and Ontario. These twin locks, which are known as Nos. 4, 5 and 6, permit ships to be passed up the escarpment at the same time as other vessels are being passed down. The total aggregate lift is 139½ feet.

years, the story of the Welland canal may be said to recapitulate the important events in the Dominion's advance among the nations of the world. From time to time, to cope with the country's ever-increasing volume of trade, no fewer than three canals had been constructed across the Niagara peninsula of Ontario from lake Erie to lake Ontario previous to the present undertaking. The first of these was opened for traffic in 1829, the second in 1845, and the third in 1870.

Improvements to the 1870 canal bringing its depth to 14 feet and other measures were effective until 1913 when it was seen that a new and much larger canal was an absolute necessity. Construction was delayed by the Great War but such progress has been made in the last few years that on Dominion Day, Canada will formally open one of the great canals of the world, and one distinguished by many unique features. The total length of the Ship Canal is 27.7 miles between the outermost

of years would only use up a small fraction of the mass of the star. A further calculation shows that the probable time a Wolf-Rayet star could continue to eject this atomic material as compared with the average life of a star explains fairly well the relative rarity of these peculiar objects.

Although it is not possible at the present time to confirm definitely this theory, originated at the Dominion Astrophysical Observatory, it has successfully met all the tests and calculations applied and is the only reasonable explanation advanced for the broad, bright bands in the spectra of the Wolf-Rayet stars, hitherto one of the most puzzling phenomena in stellar spectroscopy.

ends of approaches at Port Weller in lake Ontario and those at Port Colborne in lake Erie. For all practical purposes it is a straight line throughout, and the difference in level between lake Ontario and lake Erie (326½ feet) is overcome by seven locks of 46½ feet lift each and a guard lock. The usable length of these locks is 820 feet, the usable width 80 feet, with 30 feet of water on the sills.

The provisions of this latter depth over all permanent structures will make it possible, later, to increase the depth of the entire canal to 30 feet by excavation of the reaches, through which, for the present, a minimum navigable depth of 25 feet is being provided. The canal reaches are 200 feet wide at the bottom and 310 feet wide at the waterline. Both Port Weller and Port Colborne harbours, which may be affected by the action of waves, have been dredged to an average depth of 27½ feet below standard low water level.

The lift of the Welland Ship Canal locks has no precedent in actual construction for locks of their size. Flight locks Nos. 4, 5 and 6, down the face of the escarpment, are twin locks in one flight with a total aggregate lift of 139½ feet. They are similar to the Gatun locks on the Panama canal, which, though of somewhat larger dimensions, have an aggregate lift of only 85 feet. By means of these twin locks vessels may be passed up the escarpment at the same time as other vessels are being passed down.

There are many other interesting features in the new canal which crosses the old canal at several points and coincides with it at others, all to the advantage of the new. For instance, from Welland to Humberstone the old and new canals coincide, but just north of Humberstone the new canal leaves the old one to continue a straight alignment into the harbour at Port Colborne and thus eliminate a very sharp curve in the old canal known as Ramey's Bend. Again by keeping the summit level from Port Colborne, lake Erie, to Thorold at a regulated height by means of a guard lock, vessels can be passed into the canal without delay from the constantly fluctuating level of lake Erie. This is

GEODETIC SURVEY WORK IN MARITIME PROVINCES

**Determine Elevation and Position of Number
of Prominent Hills in New Brunswick**

The Geodetic Survey of Canada, Department of the Interior, in the course of its work on the triangulation of the Maritime Provinces has accurately determined the geographic positions and elevations of a number of prominent hills in northern New Brunswick. With the completion of a triangulation net from the head of Chaleur bay near Campbellton, N.B., southwesterly across the province of New Brunswick to Mars hill, just west of the international boundary in the state of Maine, the Geodetic Survey has been able to obtain precise values of the elevations of these hills by means of trigonometric leveling.

Access to the northerly parts of the central area of the province was for years secured only by canoe or by bush roads. For this reason the earlier values of the elevations of the high ranges of hills in the interior were arrived at only by aneroid barometer readings on trips occupying several days. Under these conditions it is not surprising that various values of the elevations showed discrepancies of considerable magnitude. However, these have now been rectified, and below are given the heights of a few of the better known hills, with mount Carleton holding the place of honour as the highest mountain in New Brunswick:—mount Carleton, at the headwaters of the Tobique and Nipisiquit rivers, 2,690 feet; Costigan, ten miles east of Oxbow on the Tobique River road, 2,197 feet; Bald peak, near Riley Brook, 2,086 feet; Blue Bell, Victoria county, 1,754 feet; Black hill, five miles west of Summit station on the Canadian National railway, near the boundary between Victoria and Carleton counties, 1,705 feet; Otter Slide, four miles north of Napadogan station, Canadian National railway, York county, 1,622 feet; Quisibis, between fifteen and twenty miles east of Edmundston, 1,619 feet; and Squaw Cap, near the junction of the Upsalquitch and Petapedia rivers, 1,584 feet.

entirely new and effects a vast improvement in navigation.

The time taken to fill a lock is eight minutes, and it is estimated that a vessel can be passed through a lock in about twenty minutes. The estimated time required to pass a vessel through the entire canal is eight hours, as against fifteen to eighteen hours on the present canal. The canal will be electrically lighted and operated, by power generated from the flow through canal operation. Though every effort has been made to reduce such structures to the minimum no fewer than twenty-one railway and highway bridges have had to be provided over the canal.

The opening of the new canal will allow the great steamers of the upper lakes, many of them over 600 feet in length, hitherto confined to the lakes above the canal, to carry their cargoes to the lower end of lake Ontario and, very shortly, to Prescott, where adequate terminal facilities are being constructed. This will materially reduce the canal-barge and rail haul between lake boat and ocean steamship.

*Prepared from material supplied by the Department of Railways and Canals

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CANADA'S ARCTIC PATROL SHIP TO SAIL ON JULY 30

ON ANNUAL VISIT
TO NORTHERN POSTS

S.S. "Beothic" Will Spend About Sixty-Five Days in Arctic Archipelago—Additional Work Planned

Although it is expected that this summer's patrol of Canada's Arctic islands by the Department of the Interior's ship, *Beothic*, will occupy only sixty-five days, considerable additional territory will be included in the area to be visited by the ship. In order to take full advantage of open water in the North, the *Beothic*, carrying a party from the North West Territories and Yukon Branch in charge of Mr. George P. Mackenzie, will not sail from North Sydney, Nova Scotia, until July 30. This is considerably later than usual but the experiences of former years have shown that this is the best period of the year in which to accomplish the work laid out for the 1930 patrol.

Eleven calls will be made by the *Beothic* during this summer's voyage. Leaving North Sydney, the ship will sail direct to Godhavn, Greenland, where conferences will be held with the Danish authorities on matters of mutual interest to the two Governments and the usual courtesies exchanged. From Godhavn, instead of crossing over to Pond Inlet, Baffin island—as has been the custom for a number of years—the *Beothic* will head for the farthest north post, Bache Peninsula, on Ellesmere island. The re-supplying of the more southerly posts will be carried out during the return voyage.

Craig Harbour, Ellesmere island, and Dundas Harbour, Devon island, will be visited in the order named and the *Beothic* will then turn west for the dash to Winter Harbour, Melville island. The cache established at this point by Captain J. E. Bernier, of the C.G.S. *Arctic*, in 1908-09, and which proved of such value to the northern party of the Canadian Arctic Expedition of 1913-18, and to Inspector A. H. Joy, of the Royal Canadian Mounted Police, during his long winter patrol in 1929, will be repaired and restocked.

The voyage westward through Lancaster sound and Barrow strait into Melville sound will begin between August 22 and 24. It is not expected that difficulty will be experienced with ice until the ship is west of Cornwallis island and by holding a course close to the southern shores of the islands it is anticipated that the objective will be

(Continued on page 3)

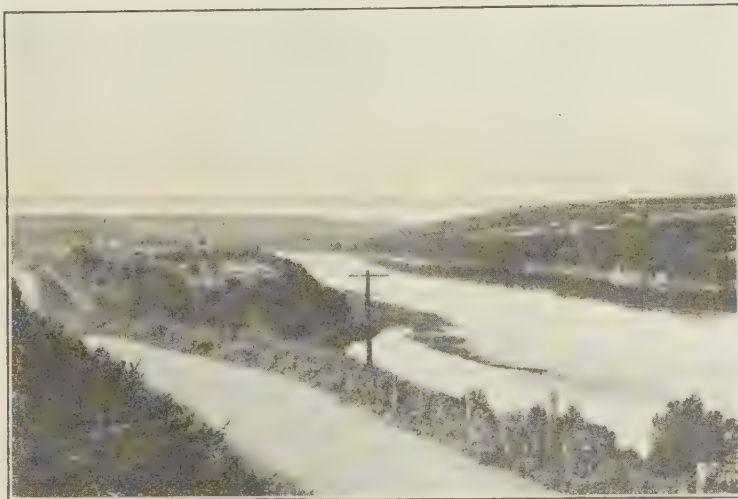
CANOEING IN EASTERN CANADA

Health, Recreation, and Scenic Beauty to be Found on
Routes in Ontario, Quebec, and the Maritimes

When planning a vacation in Canada with tent, paddle, and canoe, the greatest difficulty is usually experienced when one attempts to decide which area offers the greatest reward in sport, scenery, and other attractions. From coast to coast there is a network of lakes and streams on which one may cruise for days, weeks, or even months

to the north of the lake near Nakina are the Twin lakes, and beautiful Esnagami lake which are fast becoming better known.

Easily accessible from Sault Ste. Marie is Algoma, a rugged rocky country dotted with lakes, where the Mississagi, the Montreal, Batchawana, and Sand rivers make one forget tired



Canoeing in Eastern Canada—An inviting view along the St. John river near Meductic, New Brunswick. Lakes and streams in the East have a strong appeal to the outdoor enthusiast, offering the most healthful form of sport and enjoyment.

according to the time at one's disposal. There are certain favoured areas seemingly endowed by Nature for the special benefit of the canoeist, which may be reached by rail, steamer, or automobile.

Ontario is a lodestar for many, and each year it draws its host of devotees back to favourite waterways, or on exploratory cruises to new and untried routes. In the western part of the province are lake of the Woods and Rainy lake from each of which a maze of smaller lakes and streams are easily reached. Kakagi, Pipestone, Manitou, Minnitaki, and the lakes of the Quetico forest reserve all have charms to bring back their cohorts every season. From Hudson and Sioux Lookout north of lake of the Woods, the adventurous may start on cruises to lac Seul, Red lake, or down the Albany river to James bay. To the east of Sioux Lookout and south of lake St. Joseph is the Green Grass Lakes region, reached from McDougall Mills, where Stranger, Kimewin, Vincent, Hooker, and other lakes present ideal canoeing. To the east of this region is the Nipigon country, long famous for its trout and scenery, and

nerves and cares of business. Still further east is Timagami, that wonderland of lakes and streams which may be reached from North Bay by rail or by the recently opened Ferguson highway, a scenic route for those wishing to travel by motor.

The ancient highway of the fur-traders in their journeys from Montreal to the west offers a historic and picturesque trip with a variety of river travel. The Ottawa, Mattawa, and French rivers form that portion of the route between Montreal and Georgian bay, and each river presents an excellent cruise by itself.

The Maganatawan and other rivers in the Parry Sound district that flow down to Georgian bay have long been travelled by canoeists while the pleasures of lake Muskoka and lake of Bays are too well known to need mention. Close by are the gems of lakes scattered through Algonquin park which vie in attractiveness with the Kawartha lakes through which the Trent canal passes, and the many lakes of the Rideau system which lies between Kingston and Ottawa.

(Continued on page 3)

HYDROMETRIC DATA ARE NECESSARY IN DEVELOPING POWER

STREAM FLOW RECORDS
OF GREAT VALUE

Collection of Water-Supply Information a
Primary Function of Dominion Water
Power and Reclamation Service

The recent announcement of a further large water-power development on the Abitibi river in northern Ontario again brings to the fore the value of the hydrometric surveys conducted by the Dominion Water Power and Reclamation Service of the Department of the Interior.

In the planning of any water-power development it is essential to know two things: first, the head or fall available at the site, and, second, the flow of water which may be depended upon at all times. The head or fall may be readily established but the flow is a variable thing, changing from day to day, from month to month, and from year to year. To design a water-power development intelligently it is necessary, therefore, to have available daily records of flow covering as many years as possible and the water supply must be known within reasonable limits of error before a development can be undertaken. The work of securing such water supply records is one of the primary functions of the Dominion Water Power and Reclamation Service of the Department of the Interior and a hydrometric survey has been conducted for many years covering every province of the Dominion and practically every accessible river of importance.

In order to anticipate the locations where hydrometric records are likely to be of most value it is necessary to have, not only a thorough knowledge of the water-power possibilities on any stream, but also a general understanding of power market conditions in any district so that new development may be predicted with some degree of accuracy. This is also a function of the Dominion Water Power and Reclamation Service, and, through the systematic collection and analysis of basic water-power information over a period of years, it is in a position to select the locations where hydrometric records should be secured in an intelligent anticipation of prospective requirements.

An example of the value of such anticipation is contained in the recent announcement of the intention of the Hudson Bay Power Company to develop 275,000 horse-power at the Abitibi River canyon, together with the statement of Hon. G. Howard Fer-

(Continued on page 2)

FOREST PROTECTION IN THE WEST

Fire Prevention Services Make Early Start on Operations— Aircraft Play Important Part

The lack of precipitation during the winter of 1928-29 followed by a spring and summer of extreme drought, contributed more than any other factor to make the year 1929 one of the most critical in the forest fire history of Western Canada.

Throughout the Prairie Provinces and the Railway Belt of British Columbia, precipitation during the early winter months of 1929-30 was considerably below normal with the result that the approach of spring this year was viewed with considerable anxiety. Fortunately, however, the occurrence of snowfall and rain during the months of February, March, and April has resulted in the restoration to almost a normal degree of the total precipitation in these provinces for the period from September 1, 1929, to April 1, 1930. Moreover, there was more water in ponds and sloughs at the end of March, 1930, than at the corresponding period of last year. The growth of vegetation has also been more rapid this spring than has been the case during the previous eight years throughout these western areas; and unless weather conditions of an unusual nature should develop only a normal spring fire situation is expected for 1930.

The fire season of 1929 was not without its valuable lessons. Particularly did it emphasize the need for more permanent fire-rangings staffs in the outlying northern forest regions of the Prairie Provinces. This need has been met by the retention during the past winter of a few of the key men, and the earlier placement of fire-rangings staffs generally (about the middle of March) to check up on the travel in these areas resulting from trapping, fishing, and prospecting activities.

In Manitoba and northern Saskatchewan, aerial operations were commenced on March 15 with ski-equipped planes. These maintained a constant patrol of the northern areas in search of late winter camp-fires until break-up, and were successful in spotting and suppressing numerous incipient fires, which might otherwise have continued to smoulder in muskegs, only to break out in midsummer, spread to the adjoining timber areas, and cause extensive damage.

Up to the end of the first week in May, no fires were reported in the Railway Belt of British Columbia; six fires occurred in Alberta, 68 in Saskatchewan, and 28 in Manitoba; making a total of 102 fires, 60 per cent of which were less than ten acres in extent. Practically no damage was done to timber or young growth by these fires.

The co-operative arrangements which have existed between the Royal Canadian Air Force and the Forest Service for the use of aircraft in fire protection will continue this season. In Manitoba, Saskatchewan, and Alberta, seaplanes and flying boats totalling 21 in number, will operate from the well-established bases in these provinces to detect and suppress forest fire outbreaks. This number represents an increase of four flying boats over last year's program. Also an improved type of suppression aircraft is being supplied. These machines will be capable

of carrying greater loads and their better performance should add greatly to the efficiency of fire-fighting operations.

In Alberta, where the aerial work for the Forest Service was one of purely fire detection with land machines, some changes have been made which will reduce the number of machines operating in that province this season. The system of stationary lookouts which has been under construction on prominent peaks throughout the eastern slope of the Rockies, is now completed with the result that aircraft will no longer form the chief means of detection, but will be used only during periods when the presence of smoke palls makes visibility from these lookouts impossible. One aircraft will be kept at the High River air station in readiness for this emergency and also to aid in fire reconnaissance during fire-fighting operations. In northern Alberta, where no lookout system has as yet been installed, two detection machines will continue to operate from the base established two years ago at Grande Prairie.

In addition to aerial operations the usual ground establishments of the Forest Service both in national forests and throughout the fire-rangings districts of the four western provinces, are now in operation and are better prepared for fire emergencies which may arise in this territory than in any previous year.

An outstanding development in fire protection in the West was the enactment of a law by the Saskatchewan Legislature this year making it necessary for any person in that province to obtain a permit between April 1 and November 15, before setting out a fire in the Wooded District prescribed by the Act. Also the Act appoints Dominion fire rangers and forest officers as well as a number of Royal Canadian Mounted Police, ex-officio fire guardians to administer the Act. This measure should prove of great value in the work of forest fire protection in that province.

RECORD OIL PRODUCTION IN ALBERTA FIELDS

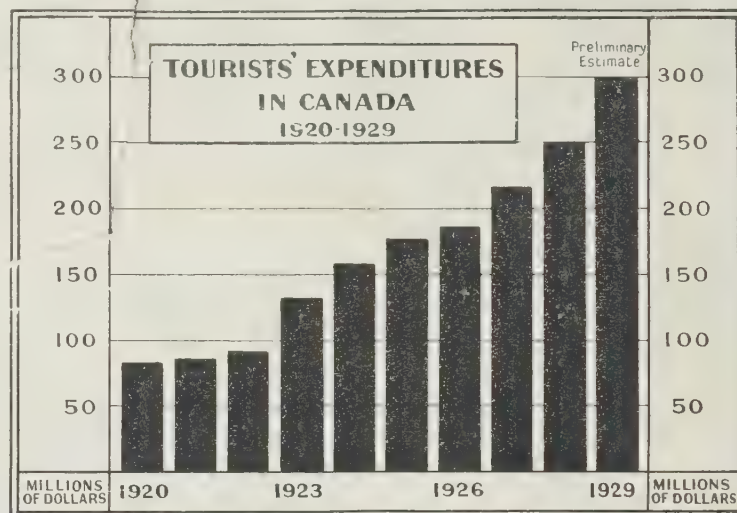
Output in March was Highest to Date—Comparative Figures by Department of the Interior

Oil production in Alberta reached a new high monthly total in March of this year when the output from all the fields reached a grand total of 109,360 barrels. Production in the Turner Valley, Red Coulee, and Wainwright fields was also the highest on record. The following comparative table prepared in the Department of the Interior from the reports of operators shows the production by grades in March, 1930, and during the same period last year:—

	Naphtha	Light	Heavy	Crude	Crude	Total
	Barrels	Barrels	Barrels	Barrels	Barrels	Barrels
March, 1930 ..	99,261	8,515	1,584			109,360
March, 1929 ..	55,646	5,243	1,206			62,095

Sitka spruce on the Pacific Coast of Canada with its light weight combined with its strength, is used universally in aeroplane manufacture.

TEN YEARS' GROWTH OF TOURIST TRADE



The rise in the value of Canada's tourist trade during the last ten years has been little short of phenomenal. Estimates of the expenditures made in the Dominion by tourists from other countries run back as far as 1920, and it will be found that during this ten-year period, 1920-29, inclusive, tourists from abroad are estimated to have spent in Canada a total of roundly \$1,682,000,000.

Such a sum of money is almost staggering, and it is difficult to find comparisons enabling us to realize its immensity. Perhaps the most startling comparison that could be made is to place this sum alongside the enormous outlays that Canada was called upon to make in connection with the Great War. According to the federal Public Accounts the total expenditure made by the Dominion Government under the heading "War and Demobilization" is placed at roundly \$1,695,000,000.

Thus the expenditures made in Canada by tourists from other countries within the last ten years are estimated at an amount which falls only a few thousand dollars short of equalling Canada's immense outlays for war and demobilization purposes. It is not to be wondered at that the highest financial authorities in Canada have recently made it a special point to direct public attention to the growth and possibilities of this comparatively youthful recruit to the ranks of the Dominion's major economic interests.

HYDROMETRIC DATA ARE NECESSARY IN DEVELOPING POWER

(Continued from page 1)

guson, Premier of Ontario, that a contract had been arranged whereby the Hydro-Electric Power Commission of Ontario would purchase 100,000 horsepower from this development.

Anticipating that power development in the Abitibi canyon would become a live issue in the early future, this Service early last year made arrangements to secure additional hydrometric data. For ten years past a gauging station had been maintained at Iroquois falls on the Abitibi river, and, although the records from this station furnished valuable and reliable data as to the water supply, additional records at the canyon, which is about 115 miles downstream, were desirable. These additional records would establish a relationship between the flow at Iroquois falls and that in the canyon and render available at the latter site closely approximate data, not only of the water available for power development, but also of the extreme low and flood flows.

Accordingly in April, 1929, an engineer of the Service was sent north to establish gauging stations at Island falls, 90 miles downstream from Iroquois falls, where there is already a power development, and at the canyon which is 25 miles farther downstream. This engineer worked continuously until well into July measuring the flow alternately at the two stations and returned in September to take further measurements. As a result of his operations a complete relationship between gauge height and flow was established

at each station for flows ranging from 5,000 to 40,000 cubic feet per second.

The ratings thus secured at the canyon and Island falls were supplied to the engineers of the Hudson Bay Power Company and, correlated with the long-term records at Iroquois falls, provided them with sufficient information to deduce long-term records for the lower river and to complete studies and prepare designs for the new power enterprise.

Another example is furnished by recent operations in the Northwest Territories where valuable mining properties have been located which will probably require a plentiful supply of power for their economic exploitation. In order to secure reliable data as to the water supply available at possible power sites, this Service last season detailed a hydrometric engineer from its Calgary staff to establish gauging stations and make measurements at the season of extreme low flow. Upon the data secured by this Service will depend, in a large measure, the final decision as to the source of power for the development of mineral properties in this region.

These two examples of the value of hydrometric surveys in promoting the development of the country could be duplicated repeatedly. In every province of the Dominion from Nova Scotia to British Columbia the stream flow records secured by the department through its hydrometric survey organization are furnishing essential data for all existing and projected water-power enterprises. In addition they are referred to continually by those engaged upon any enterprise in which the flow of water is of material consequence—domestic water supply, irrigation, drainage, bridge and similar undertakings.

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OTTAWA, JUNE, 1930

CANADA'S HISTORIC SITES AND HIGHWAYS

Extension of Motor Roads Promoting New Interest in Our Early History

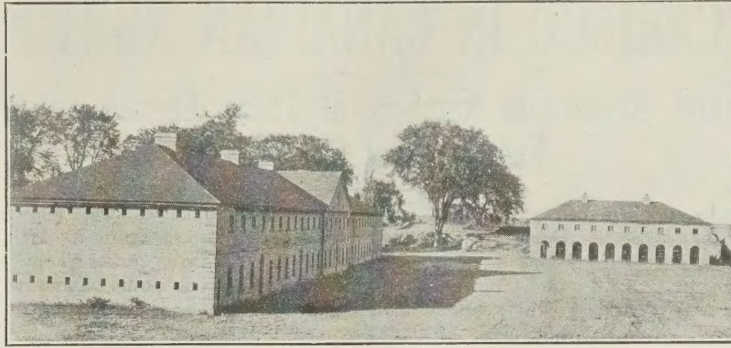
The rapid extension of hard-surfaced highways consequent upon the increasing use of the automobile is causing the re-discovery of Canada. In Eastern Canada, especially, development followed the highways and many of the stirring events in our early history occurred on or near them. These old roadways have been among the first to be surfaced and constitute the framework of the Dominion's motor highway system.

Simultaneously with the extension of our highways there has been a marked development of interest in Canada's romantic past. One outcome of this was the action of the Dominion Government in placing historic sites and monuments under the care of the National Parks of Canada, Department of the Interior, which is assisted by an advisory board of representative Canadian historians. This branch is steadily at work preserving and restoring historic buildings, ruins, and monuments and erecting cairns and tablets to commemorate striking events and outstanding personages.

Following are a number of points of historic interest which may be visited on a motor trip from eastern Ontario to Nova Scotia:—

On King's Highway No. 2 at Prescott, overlooking the St. Lawrence, stands Fort Wellington, a military stronghold of the region from 1812 until its abandonment in 1836. Two miles to the east is the famous old Windmill on Windmill Point, where loyal Canadians repulsed an attempted invasion in 1838. Five miles east of the town of Morrisburg a tall red granite obelisk marks the battlefield of Crysler's Farm, the scene of an important action in the war of 1812-14. Opposite South Lancaster, on a small island in the St. Lawrence, is Glengarry Cairn, erected by the Highland Militia of Glengarry in honour of Sir John Colborne, who commanded Her Majesty's forces in the Rebellion of 1837-38.

In the province of Quebec the motorist finds many reminders of the outstanding events in the early history of this part of the Dominion. The points of interest in the two principal cities of the province, Montreal and Quebec, are too well known to need chronicling



Canada's Historic Sites—The above view of the old barracks at Fort Lennox, Ile-aux-Noix, Quebec, shows how the work of the National Parks of Canada is preserving for posterity the outstanding historic ruins in the Dominion.

here. Following are a number of the notable historic sites and monuments on a trip through the southern part of the province:—

Fort Chambly, on the Richelieu river, is just a half an hour's drive from Montreal. The first fortifications were erected in 1663 by the French under Captain de Chambly. They were rebuilt in 1709 and later repaired, being finally abandoned as a military post in 1851. After years of neglect, the fort was taken over by the National Parks of Canada in 1921, created a national historic site, and preservation work carried out.

A good motor road running south along the Richelieu brings one to the massive ruins of Fort Lennox, Ile-aux-Noix. This island was fortified by the French but the present structure was erected by the British in 1818. It was taken over by the Department of the Interior in 1921. At Longueuil a tablet placed on the church marks the site of Fort de Longueuil. At Vercheres stands a beautiful bronze statue of the heroic Madeleine de Vercheres commemorating her famous stand against the Iroquois. A cairn and tablet at Sorel mark the site of Fort Richelieu.

A centre of great historic interest in New Brunswick is the city of Saint John, on the shores of the bay of Fundy. On the city's outskirts, on a high hill overlooking the bay, is the site of old Fort Howe. Near the shore is a tablet commemorating the landing of the United Empire Loyalists in 1783. Tablets have also been erected by the Department of the Interior on the sites of Fort LaTour and Fort Charnisay. Near Sackville the Dominion Government has established a historic park on the site of Fort Beausejour, an old French stronghold.

Crossing from New Brunswick to Nova Scotia, the motorist arrives at Windsor, Nova Scotia, where a cairn and tablet mark the site of Fort Edward, prominent in the wars of 1755-62 and 1775-82. A tablet has also been erected in the town to commemorate the founding of King's College, the first university in Canada. At Annapolis Royal, Fort Anne is the centre of the national park of the same name. This was the site of one of the oldest settlements in Canada, founded by the French in 1604. From Annapolis the scenic coast highway takes one to Halifax, a city abounding in places of historic interest. Halifax had the first dockyard, the first printing press, and the first post office in British North America. Tablets commemorate these unique facts.

The concluding point of major historical interest in the Maritimes is the majestic ruin of Fort Louisbourg on Cape Breton island. An area of five hundred acres has been acquired here by the National Parks of Canada and much work done to preserve the ruin.

CANOEING IN EASTERN CANADA

(Continued from page 1)

The Laurentian mountains in the province of Quebec cradle innumerable lakes, and between the hills flow streams and rivers of varied character. The route from Maniwaki to Ottawa is one often retraversed as it leads through such delightful bodies of water as Thirty-one Mile, Whitefish, and other lakes of the Gatineau district to the Lievre river, which stream is descended to the Ottawa. At the headwaters of the Lievre is an interesting lake country easily reached by rail, and there Manuan, Nemikachi, and other lakes form a chain of canoeing waters which is being visited each year by increasing numbers. From St. Felicien in the Lake St. John region and from Oskeleane are routes to the newly developed mining area about lake Chibougamau, and the adventurous may continue to lake Mistassini or even on to James bay by the Rupert river.

Crossed by game trails are the boisterous streams of northern New Brunswick. From Plaster Rock near the western boundary of the province one may journey up the Tobique and down the Nipisiguit river; reverse the trip by starting from Bathurst on the baie de Chaleur, or turn aside by the Upsalquitch and go down to Matapedia. Less strenuous is the two-hundred-mile cruise down the Saint John river from Grand Falls to its mouth. The winding Miramichi and the Chiputneticook lakes are but two of the many other interesting routes which are available in New Brunswick.

Sandy beaches, sheltered coves, bays, and harbours are usually uppermost in thoughts of Nova Scotia, but inland are many lake areas which delight the canoeist, fisherman, and hunter. Rosignol, Kejimikujik and the Ponhook lakes attract many, and those that prefer river travel may turn to the Medway, Liverpool, Roseway, Tusket, or the Sissiboo rivers with the assurance that their selection has not been in vain. The Bras d'Or lakes of Cape Breton have scenery that varies from alpine grandeur to peaceful glades and waterescapes. Ainslie lake, Mira lake, and others present scenes of charm that cause the canoeist to rest his paddle on the thwart and gaze in silent wonder.

The canoeist will find conditions in Prince Edward Island different from those of any of the other provinces. No extended trips are available, but in their stead will be found delightful cruises on tidal inlets, short streams, and rivers where the joys of camping and canoeing can be experienced in sufficient measure to satisfy the urge for out-door living.

Maps and detailed information on canoe routes in Canada will be supplied upon application to the Department of the Interior, Ottawa.

CANADA'S ARCTIC PATROL SHIP TO SAIL ON JULY 30

(Continued from page 1)

reached with no great trouble. The cache, which contains such supplies as tea, sugar, coffee, flour, sea biscuits, bacon, canned meat, ammunition, and other necessities, will be replenished and a quantity of dog feed added.

Returning eastward, the *Beothic* will call at Pond Inlet, River Clyde, Pangnirtung, and Lake Harbour, all on Baffin island. At the last-named post materials will be landed for the erection of a dwelling to be occupied by Mr. J. D. Soper. Mr. Soper, who is a scientific investigator for the North West Territories and Yukon Branch, will be accompanied by his wife, who is a trained nurse, and they will go north on a Hudson's Bay Company's boat early this season. He will spend two years in southern Baffin island carrying on further investigations in connection with the Eskimos and wild life and in making surveys of parts of the coastline and inland lakes.

From Lake Harbour the expedition will proceed into Hudson bay to land supplies at Chesterfield for the erection of a warden's cabin at the east end of the Thelon Game Sanctuary. Dr. D. S. Bruce, the ship's doctor, will relieve Dr. L. D. Livingstone, who has been Medical Health Officer at this post since the beginning of the year. Dr. Livingstone will return south with the ship. Leaving Chesterfield the *Beothic* will touch at Port Burwell before beginning the homeward dash along the Labrador coast to North Sydney, which will be reached, it is expected, toward the end of September.

As in former years the *Beothic* will be in charge of Mr. George P. Mackenzie, of the North West Territories and Yukon Branch, with Captain E. Falk as Ship's Master. Captain L. D. Morin will be the Ice Pilot, and Dr. D. S. Bruce, Ship's Doctor, during the greater part of the voyage. Inspector A. H. Joy, of the Royal Canadian Mounted Police, will go north for the annual inspection of the detachments in the eastern Arctic. He will be accompanied by eleven members of the force who will relieve those who have completed their period of duty in the North. Mr. A. Y. Jackson, the artist who is painting a number of pictures of northern scenes for the Government; Lieut. Commander N. G. Ricketts, of the International Ice Patrol, who is to make a study of the ice encountered on the voyage; and Dr. Peter Heinbecker, of Washington University, St. Louis, Missouri, who is studying the blood groups of the Eskimos, will also accompany the expedition.

Dr. M. P. Porsild, Director of the Danish Government Scientific Station at Godhavn, Greenland, who has been in Ottawa for some time, will accompany the expedition as far as the Greenland port. Dr. Porsild, who is the father of Messrs. A. E. and R. T. Porsild, of the North West Territories and Yukon Branch, is an eminent botanist, and during his stay in Ottawa has been making a classification of the 15,000 herbarium specimens collected by the Porsild brothers during their investigations in 1927-28 in connection with the establishment of the Dominion Government reindeer herds in the northern Mackenzie District.

There are approximately 6,000 Eskimos in Arctic Canada, scattered in small groups in the Arctic islands and along the northern seaboard.

ORIGIN OF TOWNSHIP NAMES IN ONTARIO

Many Names Commemorate Leaders in Political and Social Life of Great Britain

The first townships of Ontario were named prior to the organization of the province in 1791. The townships were laid out for the accommodation of loyalists who came from the United States to Canada after the treaty of Versailles in 1783. The first land surveyed fronted the St. Lawrence river, where there are to-day such townships as Kingston, Elizabethtown, Pittsburgh, Cornwall, and Charlottenburgh. Available information would indicate that many of these names were given first as town names and afterwards extended to the surrounding townships. In documents, Kingston is called Cataraqui as late as 1788. The first mention of the modern name is in a letter signed by John Collins, Deputy Surveyor General and dated Quebec, July 7, 1788. The occurrence of Kingston as a township designation is later. Collins mentions Elizabethtown and Pittsburgh as town names under date July 7, 1788. The earliest reference to a township by name is to Lake township, Glengarry county, in a letter dated June 18, 1785. A letter of date July 26, 1787, records the change of this name to Lancaster. The same letter mentions Charlottenburgh as a township name. The first list of township names known to the Geographic Board of Canada is dated Kingston, September 23, 1789, and contains the following names:—Pittsburgh, Ernesttown, Sydney, Richmond, Thurlow, Camden, Fredericksburgh.

As to the meaning of the names above mentioned, Kingston commemorates George III; Lancaster is a title of the King (Duke of Lancaster); Charlottenburgh commemorates Queen Charlotte, the Royal Consort; Fredericksburgh, Prince Frederick, the King's second son; Ernesttown (as the name is now spelled), Prince Ernest, the King's fifth son; Cornwall, Prince George, Duke of Cornwall, afterwards George IV. Pittsburgh commemorates the younger William Pitt; Camden, the Earl of Camden; Thurlow, Baron Thurlow; Richmond, the Duke of Richmond; and Sydney, (now spelled Sidney) Viscount Sydney; leaders in the political and social life of Great Britain.

SETTLEMENT IN WESTERN CANADA

Increase in April in Number of Homestead Entries and Soldier Grants as Compared with Last Year

The record for the month of April of the number of homestead entries and soldier grants made in Western Canada shows an increase over that for the corresponding period last year. The statement, as compiled by the Dominion Lands Administration, Department of the Interior, follows:—

Agency	Homestead 1929	Homestead 1930	Soldier Grant 1929	Soldier Grant 1930
Calgary...	29	23	1	2
Dauphin...	42	36	1	—
Edmonton...	349	527	8	19
Grande Prairie...	264	318	23	24
Kamloops...	4	6	2	—
Lethbridge...	28	8	—	1
Moose Jaw...	160	70	20	2
New Westminster...	5	—	—	—
Peace River...	311	407	12	11
Prince Albert...	255	382	4	16
Revelstoke...	4	1	—	—
Winnipeg...	24	40	1	1
	1,475	1,818	72	76
Total Entries for April, 1929.....	1,554			
Total Entries for April, 1930.....	1,894			

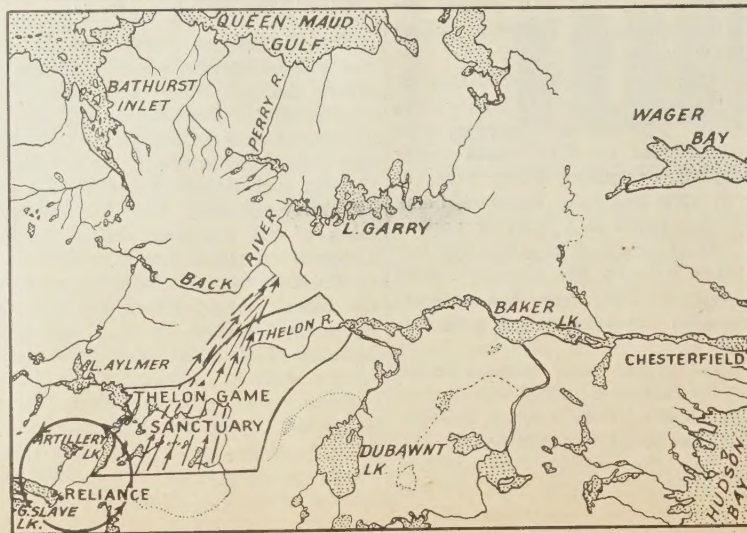
CARIBOU IN CANADIAN NORTH

Marked Increase in Numbers of These Animals in Area East of Great Slave Lake

Observations made by explorers and investigators of the Department of the Interior over a considerable period indicate that a decided improvement has taken place in recent years in the condition of the caribou herds of Canada's northland. To the west in Yukon Territory and eastward almost to Hudson bay the caribou are reported in large numbers, in many cases having

lake to the mouth of the Snowdrift river, then eastward again to Artillery lake. Mr. Hoare's duties kept him travelling from one point to another in this great circle, and the movement reminded him of the method of preparing for a parade by marching the units around a city hall square.

Early in the month of March a distinct migration began, proceeding from



Caribou in Canadian North—The above map of a portion of the Northwest Territories shows in the lower left hand corner the Thelon Game Sanctuary. The circle shows where the caribou "milled" around Artillery lake while the arrows pointing upward indicate the direction and wedge-like shape of the caribou migration, both of which movements are described in the accompanying article.

reappeared on their old migrational routes. The frequent changing of migrational routes is a characteristic of the caribou and a source of worry and uncertainty to natives and others depending on the caribou for food. However the return of the caribou in such large numbers to the old routes is looked upon as a favourable sign.

Mr. W. H. B. Hoare, investigator for the North West Territories and Yukon Branch, in the course of his patrol and investigation of the Thelon Game Sanctuary east of Great Slave lake in 1928 and 1929, had unusual opportunities for studying the caribou migrations in the eastern part of the Mackenzie District and secured much data on hitherto unobserved phases of this important subject.

During the winter of 1928-29 Mr. Hoare was engaged in transporting supplies for the sanctuary patrol for the season of 1929 from Reliance at the east end of Great Slave lake eastward to the Thelon river a distance by their route of about 200 miles. The western boundary of the Thelon preserve is formed by a chain of long, narrow lakes of which the most southerly is Artillery lake, and the next, Ptarmigan. These lakes are roughly parallel with the course of the Thelon river and from 100 to 120 miles west of that stream.

Early in the winter numbers of caribou began to appear on both sides of Artillery lake, and about the middle of December the herds joined in a great anti-clockwise milling movement in a circle, seventy-five to one hundred miles in diameter. They went north up the east side of Artillery lake, turned westward and crossed Ptarmigan lake on the ice, then, swinging to the south, crossed the east arm of Great Slave

lake to the mouth of the Snowdrift river, then eastward again to Artillery lake. Mr. Hoare's duties kept him travelling from one point to another in this great circle, and the movement reminded him of the method of preparing for a parade by marching the units around a city hall square. Early in the month of March a distinct migration began, proceeding from

the south end of Artillery lake to the northeast. The moving mass was wedge-shaped, with the thin edge to the front. It took six weeks for it to pass a given point and in that time it gradually expanded from a few hundred yards in width until the base of the wedge covered the whole space between Artillery lake and Thelon river. The spear head consisted of a narrow column of old bulls. During the first two weeks nothing but bulls appeared in the widening phalanx; then occurred two weeks when bulls and cows were about evenly mixed through the moving herds; whereas during the last two weeks cows and yearlings made up practically all of the animals seen.

During this period of a month and a half Mr. Hoare and his assistant were moving back and forth between Artillery lake and Thelon river, almost at right angles to the moving mass. In the earlier trips as they moved eastward they would pass beyond the line of march and on their return would find that it had broadened out in that direction, until finally the tracks spread across the whole expanse, so that for miles it would be impossible to take a step without crossing one or more caribou tracks. At no place was the snow trodden down into a path. This indicated that the caribou travelled in extended order and that they were grazing as they went.

HIGH HONOUR FOR CANADIAN ASTRONOMER

Director of Dominion Astrophysical Observatory Receives Royal Astronomical Society's Gold Medal

At the annual meeting of the Royal Astronomical Society of England, in London on May 9, Dr. J. S. Plaskett, Director of the Dominion Astrophysical Observatory, Victoria, B.C., was presented with the society's highest and most-prized distinction, the Gold Medal. The award according to the announcement was made for "valuable researches in stellar radial velocities and important conclusions derived therefrom." Dr. Plaskett, by invitation, also delivered on this occasion the George Darwin lecture, one of the most notable opportunities for discussing recent advances in astronomy.

A month previously, in Boston, on April 8, Dr. Plaskett was presented with the Rumford medal of the American Academy for his researches in the spectra of the stars.

These awards are striking evidence of the high standing of Canada in astronomical research and of her progressiveness in establishing and maintaining two national observatories of the first rank—the Dominion Observatory at Ottawa, Mr. R. Meldrum Stewart, Director; and the Dominion Astrophysical Observatory at Victoria, B.C., under the direction of Dr. Plaskett.

fine their seasonal movements to the central part of the caribou range. Thus in the spring migration the bulls are in the lead at the beginning but the cows soon overtake them and pass through their ranks. The cows continue on to the fawning grounds, while the northern limit of the bull migration is governed by the desire to secure good summer pasturage and to escape insect pests.

Hon. Charles Stewart, Minister of the Interior, has always taken a keen personal interest in wild life matters in the Northwest Territories and through the investigations and surveys of his officers has been kept closely in touch with the changing conditions. Game regulations and other laws governing the protection of wild life have been revised from time to time to provide for the altering situation and this constant and close supervision is considered to have been one of the factors in the present gratifying changes as regards caribou.

Sunspots and Rabbits

The numbers of pelts received by the Hudson's Bay Company from year to year since about 1840 show marked periodic variation. According to an investigation made at the Dominion Observatory, Ottawa, the number of rabbit pelts was, on the average, three times greater one year before the minimum of sunspots than at the maximum.

Demand for Wood Steady

Although each year sees more substitutes on the Canadian market, the amount of wood used remains practically constant. This is due to the new uses being continually found for wood, as a result of the great amount of research now being carried on with a view to finding new uses for wood in its natural condition or by modifications, chemically or mechanically.



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